



NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

PROJECT ID:

S195-227S

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

LAW

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

VOLUME 1 OF 3

BID BOOKLET

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

Spring Street Salt Shed Construction

LOCATION:
BOROUGH:
CITY OF NEW YORK

553 Canal Street
Manhattan 10013

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

Dept of Sanitation

Dattner Architects



Date:

August 2, 2013

4-0 18



NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Ramon Rodriguez

Agency Chief
Contracting Officer

February 19, 2014

CERTIFIED MAIL - RETURN RECEIPT REQUEST

OLIVEIRA CONTRACTING, INC.

15 Albertson Avenue
Albertson, NY 11507

RE: FMS ID: S195-227S
E-PIN: 85013B0016001
DDC PIN: 8502014TR0001C
SPRING STREET SALT SHED
CONSTRUCTION - BOROUGH OF
MANHATTAN
NOTICE OF AWARD

Dear Contractor:

You are hereby awarded the above referenced contract based upon your bid in the amount of \$18,407,814.00 submitted at the bid opening on October 09, 2013. Within ten (10) days of your receipt of this notice of award, you are required to take the actions set forth in Paragraphs (1) through (3) below. For your convenience, attached please find a copy of Schedule A of the General Conditions to the Contract, which sets forth the types and amounts of insurance coverage required for this contract.

- (1) Execute four copies of the Agreement in the Contracts Unit, 30-30 Thomson Avenue, 1st Floor, Long Island City, New York (IDCNY Building). A Commissioner of Deeds will be available to witness and notarize your signature. The Agreement must be signed by an officer of the corporation or a partner of the firm.
- (2) Submit to the Contracts Unit four properly executed performance and payment bonds. If required for this contract, copies of performance and payment bonds are attached.
- (3) Submit to the Contracts Unit the following insurance documentation: (a) original certificate of insurance for general liability in the amount required by Schedule A, and (b) original certificates of insurance or other proof of coverage for workers' compensation and disability benefits, as required by New York State Law. The insurance documentation specified in this paragraph is required for registration of the contract with the Comptroller's Office.



On or before the contract commencement date, you are required to submit all other certificates of insurance and/or policies in the types and amounts required by Schedule A. Such certificates of Insurance and/or policies must be submitted to the Agency Chief Contracting Office, Attention: Risk Manager, Fourth Floor at the above indicated department address.

Your attention is directed to the section of the Information for Bidders entitled "Failure to Execute Contract". As indicated in this section, in the event you fail to execute the contract and furnish the required bonds within the (10) days of your receipt of this notice of award, your bid security will be retained by the City and you will be liable for the difference between your bid price and the price for which the contract is subsequently awarded, less the amount of the bid security retained.

Sincerely,

Lorraine Holley
DACCO

Bid Tab

Revised *
Description

SPRING STREET SALT SHED CONSTRUCTION - BOROUGH OF MANHATTAN

Bid Date	10/9/2013	FMS ID	S195-227S
Estimated Cost	\$26,800,000.00	PLA	Yes
Bid Security	2% of Total Bid Price	Client Agency	Dept. of Sanitation
Time Allowed	365 CCD	Contract Manager	Eugene Werner
Addendum	3	Project Manager	Ziedonis, John
PIN	8502014TR0001C	E-PIN	85014B0016001*
Selective Bidding	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Consultant	Dattner Architects

Bid Rank	Vendor	Bid Amount	Security Type
1	ASHNU INTERNATIONAL, INC	Alt. 1 \$16,500,000.00 Alt. 2 \$17,700,000.00	Bond
2	OLIVEIRA CONTRACTING, INC.	Alt. 1 \$18,407,814.00 Alt. 2 \$19,892,098.00	Bond
3	PAUL J. SCARIANO INC.	Alt. 1 \$19,618,505.00 Alt. 2 \$21,568,505.00	Bond
4	TRITON STRUCTURAL CONCRETE, INC.	Alt. 1 \$20,173,894.22 Alt. 2 \$22,679,629.52	Bond
5	TULLY CONSTRUCTION CO. INC.	Alt. 1 \$20,358,000.00 Alt. 2 \$22,128,000.00	Bond
6	E.E. CRUZ & COMPANY, INC.	Alt. 1 \$20,450,000.00 Alt. 2 \$22,050,000.00	Bond
7	PADILLA CONSTRUCTION SERVICES, INC	Alt. 1 \$21,467,630.00 Alt. 2 \$23,777,630.00	Bond
8	D'ONOFRIO GENERAL CONTRACTORS CORP.	Alt. 1 \$21,973,000.00 Alt. 2 \$23,158,752.00	Bond
9	LEON D. DEMATTEIS CONSTRUCTION CORPORATION	Alt. 1 \$22,098,000.00 Alt. 2 \$24,698,000.00	Bond

Bid Rank	Vendor	Bid Amount	Security Type
10	NAVILLUS TILE INC. D/B/A NAVILLUS CONTRACTING	Alt. 1 \$22,675,000.00 Alt. 2 \$26,625,000.00	Bond
11	ROCKMORE CONTRACTING CORP.	Alt. 1 \$23,868,000.00 Alt. 2 \$25,900,000.00	Bond
12	CITNALTA CONSTRUCTION CORP.	Alt. 1 \$24,326,709.35 Alt. 2 \$26,926,709.35	Bond
13	DELRIC CONSTRUCTION CO., INC.	Alt. 1 \$24,696,000.00 Alt. 2 \$27,196,000.00	Bond
14	NEW YORK CONCRETE CORP.	Alt. 1 \$29,700,000.00 Alt. 2 \$32,061,000.00	Bond

Sub-Contractors:

Plumbing – Varsity Plumbing & Heating	Alt. 1 \$68,275.00 Alt. 2 \$68,275.00
HVAC – Chapman & Evans Inc.	Alt. 1 \$99,000.00 Alt. 2 \$99,000.00
Electrical – Community Electric	Alt. 1 \$492,750.00 Alt. 2 \$492,750.00

Recorder: Phyllis Lopez – ext. 1283

Approver: 

Bid Tab
Pin: 8502014TR0001C

Qualification Form

Project ID: S195-227S

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: Scalamandre/Oliveira JV

Name of Project: Construction of a Vent Buildg Structure and Reconstruction of 11th Ave and W. 36th St. at Site K

Location of Project: 11th Ave & W. 36th St. New York, NY

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

Name: Sammy Mercado

Title: Project Manager Phone Number: 347-301-3701

Brief description of work completed: Dirt & Rock Excavation, Demo existing structures, backfill, reinforced concrete building, masonry, electrical, plumbing, concrete roadway structure, asphalt topping, curb, sidewalk, etc..

Was the work performed as a prime or a subcontractor: Prime (JV member)

Amount of Contract: \$57,882,000.00

Date of Completion: November 2012

Name of Contractor: M.A. Angeliades, Inc.

Name of Project: Rehab of Bleecker St. & Broadway-Lafayette Complex

Location of Project: Houstrn & Lafayette St., New York, NY

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

Name: Dimitri Malakidis

Title: Project Executive Phone Number: 917-685-7171

Brief description of work completed: Excavation, backfill, demo, steel face curb, sidewalk, full roadway restoration, structural & architectural concrete, granite curb, granite paverss, belgium block paving....

Was the work performed as a prime or a subcontractor: Subcontractor

Amount of Contract: \$20,800,000.0

Date of Completion: November 2012

Qualification Form

Project ID: S195-227S

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: 44 Lexington Associates, LLC

Name of Project: Lexington House Hotel

Location of Project: 517 Lexington Ave., New York, NY

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

Name: Haresh Majmundar

Title: Project Exec. Phone Number: 917-902-7616

Brief description of work completed: Excavation, concrete foundation, waterproofing, reinforced concrete superstructure (26 stories)

Was the work performed as a prime or a subcontractor: Foundation as Prime Superstructure as Sub

Amount of Contract: 10,050,000.00

Date of Completion: September 2010

Name of Contractor: Express Airport Developers

Name of Project: Hampton Inn @ LaGuardia Airport

Location of Project: 102-40 Ditmars Blvd, East Elmhurst, NY

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

Name: Martin Field

Title: Owner Phone Number: 484-253-1633

Brief description of work completed: Excavation, site improvements, drainage, concrete foundation, reinforced concrete retaining wall, architectural walls, asphalt paving

Was the work performed as a prime or a subcontractor: Prime

Amount of Contract: 3,000,000.00

Date of Completion: Jul 2009

Tax ID #: 56-2361008

APT E-
PIN#: 85014B0016

Contract # 1 - General Construction Work

SCHEDULE B - M/WBE Utilization Plan

Part I: M/WBE Participation Goals

Part I to be completed by contracting agency

Contract Overview

APT E-Pin # 85014B0016 FMS Project ID#: S195-227S
 Project Title/Agency Spring Street Salt Shed
 PIN # 8502014TR0001C
 Bid/Proposal
 Response Date: October 9, 2013
 Contracting Agency Department of Design and Construction
 Agency Address 30-30 Thomson Avenue City Long Island City State NY Zip Code 11101
 Contact Person James A. Cerasoli Title Deputy Director
 Telephone # (718) 391-1549 Email CERASOLI@DDC.NYC.GOV

Project Description (attach additional pages if necessary)

This Project consists of the construction of a new fully enclosed, cast-in-place concrete salt shed; gated service yard; lot line concrete protection and push walls. This facility shall be constructed on a drilled caisson foundation. The floor slab, service yard and drive shall be a structural concrete slab supported by drilled caissons. The building will have exterior walls of cast-in-place concrete and a precast concrete roof deck supported by steel plate girders. Work includes related site work, mechanical, plumbing, electrical and other items noted on the Contract Documents.

M/WBE Participation Goals for Services
 Enter the percentage amount for each group or for an unspecified goal.

Prime Contract Industry: Construction

Group	Percentage
<u>Unspecified</u>	<u>3 %</u>
OR	
<u>Black American</u>	<u>UNSPECIFIED %</u>
<u>Hispanic American</u>	<u>UNSPECIFIED %</u>
<u>Asian American</u>	<u>UNSPECIFIED %</u>
<u>Women</u>	<u>UNSPECIFIED %</u>
Total Participation Goals	3 %

Line 1

Tax ID #: 56-2361008

APT E-
PIN#: 85014B0016

SCHEDULE B - Part II: M/WBE Participation Plan

Part II to be completed by the bidder/proposer:

Please note: For Non-M/WBE Prime Contractors who will NOT subcontract any services and will self-perform the entire contract, you must obtain a FULL waiver by completing the Waiver Application on pages 9 and 9a and timely submitting it to the contracting agency pursuant to the Notice to Prospective Contractors. Once a FULL WAIVER is granted, it must be included with your bid or proposal and you do not have to complete or submit this form with your bid or proposal.

Section I: Prime Contractor Contact Information

Tax ID #	<u>56-2361008</u>	FMS Vendor ID #	<u>0003295643</u>
Business Name	<u>Oliveira Contracting, Inc.</u>	Contact Person	<u>Joel Martins</u>
Address	<u>15 Albertson Ave., Albertson, NY 11507</u>		
Telephone #	<u>516-333-6343</u>	Email	<u>jmartins@oliveiracontracting.com</u>

Section II: M/WBE Utilization Goal Calculation: Check the applicable box and complete subsection.

PRIME CONTRACTOR ADOPTING AGENCY M/WBE PARTICIPATION GOALS

<input checked="" type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Agency M/WBE Participation Goals.	Total Bid/Proposal Value	Agency Total Participation Goals (Line 1, Page 6)	Calculated M/WBE Participation Amount
<p>Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.</p> <p>Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.</p>	\$18,407,814 X	3%	\$552,234.42 Line 2

PRIME CONTRACTOR OBTAINED PARTIAL WAIVER APPROVAL: ADOPTING MODIFIED M/WBE PARTICIPATION GOALS

<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Modified M/WBE Participation Goals.	Total Bid/Proposal Value	Adjusted Participation Goal (From Partial Waiver)	Calculated M/WBE Participation Amount
<p>Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.</p> <p>Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.</p>	\$ X	=	\$ Line 3

Section III: MWBE Utilization Plan: How Proposer/Bidder Will Fulfill MWBE Participation Goals. Please review the Notice to Prospective Contractors for more information on how to obtain credit for MWBE participation. Check applicable box. The Proposer or Bidder will fulfill the MWBE Participation Goals:

- As an MWBE Prime Contractor that will self-perform and/or subcontract to other MWBE firms a portion of the contract the value of which is at least the amount located on Lines 2 or 3 above, as applicable. The value of any work subcontracted to non-MWBE firms will not be credited towards fulfillment of MWBE Participation Goals. Please check all that apply to Prime Contractor:
 - MBE
 - WBE
- As a Qualified Joint Venture with an MWBE partner, in which the value of the MWBE partner's participation and/or the value of any work subcontracted to other MWBE firms is at least the amount located on Lines 2 or 3 above, as applicable. The value of any work subcontracted to non MWBE firms will not be credited towards fulfillment of MWBE Participation Goals.
- As a non MWBE Prime Contractor that will enter into subcontracts with M/WBE firms the value of which is at least the amount located on Lines 2 or 3 above, as applicable.

Section IV: General Contract Information

What is the expected percentage of the total contract dollar value that you expect to award in subcontracts for services, regardless of MWBE status? % _____

Enter brief description of the type(s) and dollar value of subcontracts for all services you plan on subcontracting if awarded the contract. For each item indicate whether the work is designated for participation by MBEs and/or WBEs and the time frame in which such work is scheduled to begin and end. Use additional sheets if necessary.

1	WBE 1. BROADWAY ELECTRIC INC - ELECTRICAL - 600,000.00
2	2. TROTTMAN ASSOCIATES - PLUMBING - 100,000.00
3	3. HANCOCK HVAC ENTERPRISES - HVAC - 15,000.00
4	4. VACO CONTRACTORS INC - ROOFING / WATERPROOFING - 100,000.00
5	5. STEEL / IRON WORKS - STRUCTURAL / Misc. - 275,000.00
6	
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✓ **Scopes of Subcontract Work**

Section V: Vendor Certification and Required Affirmations

I hereby:

- 1) acknowledge my understanding of the MWBE participation requirements as set forth herein and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York (Section 6-129), and the rules promulgated thereunder
- 2) affirm that the information supplied in support of this MWBE Utilization Plan is true and correct
- 3) agree, if awarded this Contract, to comply with the MWBE 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 MWBE Participation Goals to certified MBEs and/or WBEs, unless a full waiver is obtained or such goals are modified by the Agency; and
- 5) agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the MWBE 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.

Signature *Carmelina Oliveira* Date 10-9-13
 Print Name Carmelina Oliveira Title President

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

**BID FOR FURNISHING ALL LABOR AND
MATERIAL NECESSARY AND REQUIRED FOR:**

PROJECT ID: S195-227S

**Spring Street Salt Shed Construction
553 Canal Street
Manhattan 10013**

Name of Bidder: Oliveira Contracting, Inc.

Date of Bid Opening: October 9, 2013

Bidder is: (Check one, whichever applies) Individual () Partnership () Corporation (X)

Place of Business of Bidder: 15 Albertson Ave., Albertson, NY 11507

Bidder's Telephone Number: 516-333-6343 Bidder's Fax Number: 516-333-6367

Bidder's Email Address: jmartins@oliveiracontracting.com

Residence of Bidder (If Individual): _____

If Bidder is a Partnership, fill in the following blanks:

Names of Partners

Residence of Partners

_____	_____
_____	_____
_____	_____

If Bidder is a Corporation, fill in the following blanks:

Organized under the laws of the State of New York

Name and Home Address of President: Carmelina Oliveira
91 Longfellow Ave., Levittown, NY 11756

Name and Home Address of Secretary: _____

Name and Home Address of Treasurer: _____

BID FORM

The above-named 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 set forth on the Affirmation included as page 17 of this Bid Booklet.

The bidder hereby affirms that it has paid all applicable City income, excise and other taxes for all years it has conducted business activities in New York City.

5. 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).

6. 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.

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.

7. 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.

8. 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.

9. 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:

10. **M/WBE UTILIZATION PLAN:** By signing its bid, the bidder agrees to the Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted. The Vendor Certification and Required Affirmations will be deemed to satisfy the requirement to complete Section V of Part II of Schedule B: M/WBE Utilization Plan.

Alternate Bids

Bidder is advised that the City is requesting the submission of two (2) alternate bids for **Contract #1 – General Construction Work** (Bid Alternate #1 and Bid Alternate #2). Each of these Bid Alternates addresses a different specific Scope of Work, as described below. Bid prices for these two (2) different Scopes of Work for General Construction Work shall be submitted on BID FORM - Bid Alternate 1, and BID FORM - Bid Alternate 2, in this Bid Booklet.

BID ALTERNATE #1: Requires a Total Lump Sum Price for all labor and material necessary to perform all required work described in the Contract Documents, **excluding** the scope of work for Bid Alternate #2, as described below. Bid Alternate #1 is the Project Base Bid.

BID ALTERNATE #2: Requires a Total Lump Sum Price for the following: (1) all required work for Bid Alternate #1 (Project Base Bid), plus (2) all required work for the scope of Alternate #2 work. The scope of work for Alternate #2 is to provide stainless steel reinforcement for all cast-in-place concrete structures and elements, as described in the following Contract Documents: Drawings S-001.00 and S-006.00, and Specification Section 03200.

Bidders are requested to submit prices on the Bid Forms for alternate Bids described above. Following the receipt of Bids, the Department of Design and Construction will determine, in the best interest of the City, whether to award a contract based upon the Total Bid Price for **Bid Alternate #1, or Bid Alternate #2.**

BID FORM ALTERNATE 1

PROJECT ID: S195-227S

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

- A. LUMP SUM PRICE - Total price for all labor and material for all required work set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price for Material Sold and Delivered

\$ 11890498.65

Total Price For Labor

\$ 6517315.35

Total Price for Item A = \$18407814-

BIDDER'S SIGNATURE AND AFFIDAVIT

10/9/13 P. 8

- * SUBCONTRACTOR IDENTIFICATION: You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". X Yes No

- * M/WBE UTILIZATION PLAN: By signing its bid in the space below, the bidder agrees to the Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted. The Vendor Certification and Required Affirmations will be deemed to satisfy the requirement to complete Section V of Part II of Schedule B: M/WBE Utilization Plan.

Section V: Vendor Certification and Required Affirmations: 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 5) 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.

Bidder: Oliveira Contracting, Inc.

By: [Signature] (Signature of Partner or corporate officer)

Attest: (Corporate Seal)

Secretary of Corporate Bidder

Affidavit on the following page should be subscribed and sworn to before a Notary Public

AFFIRMATION

The undersigned bidder affirms and declares that said bidder is not in arrears to the City of New York upon debt, contract or taxes and is not a defaulter, as surety or otherwise, upon obligation to the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York, nor is there any proceeding pending relating to the responsibility or qualification of the bidder to receive public contracts except None

(If none, the bidder shall insert the word "None" in the space provided above.)

Full Name of Bidder: Oliveira Contracting, Inc.
Address: 15 Albertson Ave.
City: Albertson State: New York Zip Code: 11507

CHECK ONE BOX AND INCLUDE APPROPRIATE NUMBER:

A - Individual or Sole Proprietorship *
SOCIAL SECURITY NUMBER

B - Partnership, Joint Venture or other unincorporated organization
EMPLOYER IDENTIFICATION NUMBER

C - Corporation
EMPLOYER IDENTIFICATION NUMBER

56-2361008

By: 
Signature:

Title: President

If a corporation, place seal here

This affirmation must be signed by an officer or duly authorized representative.
* Under the Federal Privacy Act the furnishing of Social Security Numbers by bidders on City contracts is voluntary. Failure to provide a Social Security Number will not result in a bidder's disqualification. Social Security Numbers will be used to identify bidders, proposers or vendors to ensure their compliance with laws, to assist the City in enforcement of laws, as well as to provide the City a means of identifying of businesses which seek City contracts.

19/10/13

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

BID ALTERNATE 1

Project ID: S195-227S

SUBMISSION: In addition to its Bid (Bid Envelope # 1), the Bidder must, at the time of the bid, complete and submit this form in a separate, sealed envelope (Bid Envelope # 2). To complete this form, the Bidder must identify the subcontractors it intends to use for the work listed below, as well as the dollar amount to be paid to each subcontractor. Failure to complete this form and submit it in a separate, sealed envelope will result in the disqualification of the bid as non-responsive.

The Bidder intends to use the following subcontractors. If the Bidder intends to do any of the work referenced below with its own forces, the Bidder should complete this form using its own name. If multiple subcontractors for any trade are proposed, Bidder may submit multiple copies of this form.

1. PLUMBING CONTRACTOR:

TAGGART ASSOCIATES CORP.
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 76,000.00

2. HVAC CONTRACTOR:

MIDTOWN HVAC ENTERPRISES LTD.
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 98,000.00

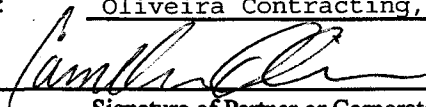
3. ELECTRICAL CONTRACTOR:

KLEINBERG ELECTRIC INC.
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 600,000.00

BIDDER'S SIGNATURE: The Bidder must sign this form in the space provided below:

Name of Bidder: Oliveira Contracting, Inc.

By: 
Signature of Partner or Corporate Officer

Print Name: Carmelina Oliveira

Title: President

**BID BOND 1
FORM OF BID BOND**

KNOW ALL MEN BY THESE PRESENTS. That we, _____
Oliveira Contracting, Inc. _____

15 Albertson Avenue, Albertson, New York 11507 _____

hereinafter referred to as the "Principal", and _____
Liberty Mutual Insurance Company _____

1200 MacArthur Boulevard, Mahwah, NJ 07430 _____

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 Total Amount Bid _____

(\$ 10%), 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 _____

Contract #S195-227 - Spring Street Salt Shed Construction _____

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.

BID BOND 2

In the event that the Proposal of the Principal shall be accepted and the Contract be awarded to him 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 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 9th day of October, 2013.

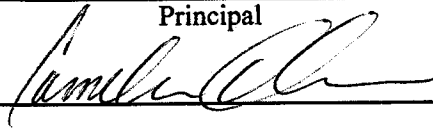
(Seal)

Oliveira Contracting, Inc.

(L.S.)

Principal

By:

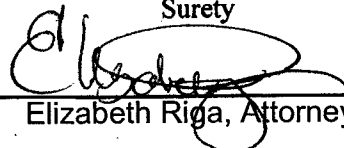


(Seal)

Liberty Mutual Insurance Company

Surety

By:



Elizabeth Riga, Attorney-in-Fact

BID BOND 3

ACKNOWLEDGEMENT OF PRINCIPAL, IF A CORPORATION

State of NEW YORK County of NASSAU ss:
On this 9th day of October, 2013, before me personally came Carmelina Oliveira to me known, who, being by me duly sworn, did depose and say that he resides at 91 LONGFELLOW AVE. LEVITTOWN, NY 11756 that he is the President of Oliveira Contracting, Inc. 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.

LUCY AMADOR
Notary Public - State of NY
No. 01RA6130289
Qualified in Nassau County
My Commission Expires 1/18/17

Lucy Amador
Notary Public

ACKNOWLEDGEMENT 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

ACKNOWLEDGEMENT 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

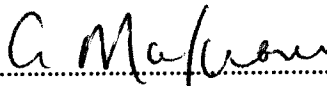
AFFIX ACKNOWLEDGEMENTS AND JUSTIFICATION OF SURETIES

ACKNOWLEDGMENT OF SURETY COMPANY

STATE OF NEW JERSEY

COUNTY OF SOMERSET

On this 9th day of **October, 2013** before me personally came **Elizabeth Riga** to me known, who, being by me duly sworn, did depose and say; that he is the Attorney-in-Fact of **Liberty Mutual Insurance Company**, the corporation described in which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by the Board of Directors of said corporation; and that he signed his name thereto by the authority of the Power of Attorney of said Company, of which a Certified Copy is hereto attached, and that he signed said Instrument as an Attorney-in-Fact of said company by like authority.



.....
Notary Public

ANN MARIE KEANE
NOTARY PUBLIC OF NEW JERSEY
MY COMMISSION EXPIRES MAY 19, 2015

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 6225744

American Fire and Casualty Company
The Ohio Casualty Insurance Company

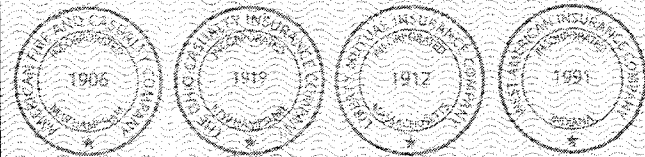
Liberty Mutual Insurance Company
West American Insurance Company

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That American Fire & Casualty Company and The Ohio Casualty Insurance Company are corporations duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Alfred C. Marquis, Jr.; Annmarie Keane; Elizabeth Riga; John J. Sciortino, Jr.; Peter H. Forenza; Robert B. Pitts; Robert S. Rapp Jr.; William X. Linney III

all of the city of Branchburg, state of NJ each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 24th day of July, 2013.



American Fire and Casualty Company
The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

By: Gregory W. Davenport
Gregory W. Davenport, Assistant Secretary

STATE OF WASHINGTON ss
COUNTY OF KING

On this 24th day of July, 2013, before me personally appeared Gregory W. Davenport, who acknowledged himself to be the Assistant Secretary of American Fire and Casualty Company, Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Seattle, Washington, on the day and year first above written.



By: KD Riley
KD Riley, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV - OFFICERS - Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

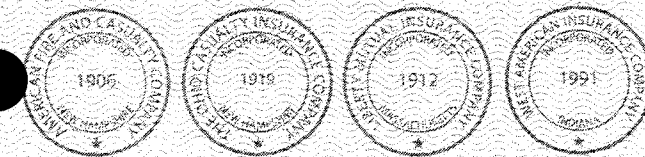
ARTICLE XIII - Execution of Contracts - SECTION 5. Surety Bonds and Undertakings. Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation - The President of the Company, acting pursuant to the Bylaws of the Company, authorizes Gregory W. Davenport, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization - By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, David M. Carey, the undersigned, Assistant Secretary, of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 9th day of October, 2013.



By: David M. Carey
David M. Carey, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or dual value guarantees.

To confirm the validity of this Power of Attorney call 1-810-832-8740 between 9:00 am and 4:30 pm EST on any business day.



LIBERTY MUTUAL INSURANCE COMPANY
 FINANCIAL STATEMENT — DECEMBER 31, 2012

Assets	Liabilities
Cash and Bank Deposits..... \$ 903,711,694	Unearned Premiums..... \$4,205,141,671
*Bonds — U.S Government 1,166,929,471	Reserve for Claims and Claims Expense..... 17,056,420,207
*Other Bonds..... 11,415,194,219	Funds Held Under Reinsurance Treaties..... 1,315,062,091
*Stocks..... 8,104,853,899	Reserve for Dividends to Policyholders..... 2,455,411
Real Estate..... 255,967,320	Additional Statutory Reserve 49,768,998
Agents' Balances or Uncollected Premiums..... 3,482,069,753	Reserve for Commissions, Taxes and
Accrued Interest and Rents..... 144,016,763	Other Liabilities <u>3,066,051,537</u>
Other Admitted Assets..... <u>14,732,623,458</u>	Total.....\$25,694,899,915
	Special Surplus Funds..... \$604,621,497
	Capital Stock..... 10,000,000
	Paid in Surplus..... 7,899,471,886
	Unassigned Surplus..... 5,996,373,279
Total Admitted Assets.....<u>\$40,205,366,577</u>	Surplus to Policyholders 14,510,466,662
	Total Liabilities and Surplus<u>\$40,205,366,577</u>



* Bonds are stated at amortized or investment value; Stocks at Association Market Values.
 The foregoing financial information is taken from Liberty Mutual Insurance Company's financial statement filed with the state of Massachusetts Department of Insurance.

I, TIM MIKOLAJEWSKI, Assistant Secretary of Liberty Mutual Insurance Company, do hereby certify that the foregoing is a true, and correct statement of the Assets and Liabilities of said Corporation, as of December 31, 2012, to the best of my knowledge and belief.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said Corporation at Seattle, Washington, this 25th day of March, 2013.

T. Mikolajewski

Assistant Secretary

October 9, 2013



Project: Spring Street Salt Shed
 Location: 553 Canal Street, New York NY 10013
 Bidder:

CONTRACT 1 - General Construction

DDC ID: S195-227S
 Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
CONTRACT 1 - GENERAL CONSTRUCTION WORK								
Division 1								
GENERAL REQUIREMENTS								
01000	Mobilization	1	LS	\$250,162.20	\$250,162.20	\$0.00	\$0.00	\$250,162.20
	Debris Protection Nets	1	LS	\$36,227.00	\$36,227.00	\$0.00	\$0.00	\$36,227.00
	Public Protection	415	LF	\$218.25	\$90,573.75	\$0.00	\$0.00	\$90,573.75
	Sidewalk Bridge /Fence	1	LS	\$14,490.00	\$14,490.00	\$0.00	\$0.00	\$14,490.00
	Misc Protection	1	LS	\$7,245.00	\$7,245.00	\$0.00	\$0.00	\$7,245.00
	Maintain Fence	1	LS	\$3,625.00	\$3,625.00	\$0.00	\$0.00	\$3,625.00
	Code Signage	1	LS	\$6,645.00	\$6,645.00	\$0.00	\$0.00	\$6,645.00
	Miscellaneous Specialties	1	EA	\$6,038.00	\$6,038.00	\$0.00	\$0.00	\$6,038.00
	Trailer Hook-Ups	1	LS	\$10,264.00	\$10,264.00	\$0.00	\$0.00	\$10,264.00
	Temporary Water for Construction	1	LS	\$6,279.00	\$6,279.00	\$0.00	\$0.00	\$6,279.00
	Temporary Toilets	6,648	MH	\$30.00	\$199,440.00	\$0.00	\$0.00	\$199,440.00
	Security Guard/ Fire Guard				\$630,988.95		\$0.00	\$630,988.95
	Subtotal							
Division 2								
EXISTING CONDITIONS								
02200 Earthwork								
	Mass Soil Excavation for Mat Slab	2,665	CY	\$44.80	\$119,392.00	\$13.50	\$35,977.50	\$155,369.50
	Excavate for Pits	1	LS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Carting	2,665	CY	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Local Dewatering including Line & Grade, Master Mech	1	LS	\$140,125.00	\$140,125.00	\$0.00	\$0.00	\$140,125.00
	Subtotal				\$259,517.00		\$35,977.50	\$295,494.50
02260 Excavation Support and Protection (Included w/ 02200)								
02470 Drilled Caisson Piles								
	Sheeting/ Piling Work	1,584	SF	\$28.80	\$45,619.20	\$36.00	\$57,024.00	\$102,643.20
	300 ton							
	12" Diameter, 3/8" thick casing (100 LF Allowance)	8,300	VLF	\$60.00	\$498,000.00	\$20.00	\$166,000.00	\$664,000.00
	12' Caisson Embed in Bedrock per F-0100	996	VLF	\$310.00	\$308,760.00	\$95.00	\$94,620.00	\$403,380.00



Project: Spring Street Salt Shed
 Location: 553 Canal Street, New York NY 10013
 Bidder:

CONTRACT 1 - General Construction

DDC ID: S195-227S
 Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	6000 psi Concrete Fill	375	CY	\$543.40	\$203,775.00	\$117.15	\$43,931.25	\$247,706.25
	Steel Reinforcement #18 Grade 75 Thread Bar - (EA, 100 LF)	255,000	LBS	\$1.50	\$382,500.00	\$0.66	\$168,300.00	\$550,800.00
	200 ton				\$0.00		\$0.00	\$0.00
	12" Diameter, 3/8" thick casing (100 LF Allowance)	3,700	VLF	\$61.60	\$227,920.00	\$20.55	\$76,035.00	\$303,955.00
	9' Caisson Embed in Bedrock	296	VLF	\$312.75	\$92,574.00	\$99.00	\$29,304.00	\$121,878.00
	6000 psi Concrete Fill	165	CY	\$543.40	\$89,661.00	\$117.00	\$19,305.00	\$108,966.00
	Steel Reinforcement #14 Grade 75 Thread Bar - (EA, 100 LF)	71,000	LBS	\$1.50	\$106,500.00	\$0.66	\$46,860.00	\$153,360.00
	Video inspection of rock sockets	1	LS	\$21,740.00	\$21,740.00	\$59,650.00	\$59,650.00	\$81,390.00
	Lateral load test	2	EA	\$7,245.00	\$14,490.00	\$3,620.00	\$7,240.00	\$21,730.00
	Tension load test	1	EA	\$7,245.00	\$7,245.00	\$3,620.00	\$3,620.00	\$10,865.00
	Misc Pits	1	EA	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Mobilization & Spoil Removal	1	EA	\$102,640.00	\$102,640.00	\$32,055.00	\$32,055.00	\$134,695.00
	Subtotal				\$2,101,424.20		\$803,944.25	\$2,905,368.45
02503	Installation of Buried Pipelines (Included w/ 02504)							
02504	Sanitary and Storm Sewer Structures							
	Site Utilifies Street connection Storm water	1	LS	\$4,057.00	\$4,057.00	\$12,470.00	\$12,470.00	\$16,527.00
	Trench Drains							
	12" Trench Drain at gates - Concrete/SS Channel	96	LF	\$29.00	\$2,784.00	\$64.00	\$6,144.00	\$8,928.00
	Trench Drain Grating inside roll up door and sitework 12" wide	96	LF	\$187.00	\$17,952.00	\$27.25	\$2,616.00	\$20,568.00
	6" Trench Drain - Concrete channel	244	LF	\$53.00	\$12,932.00	\$64.00	\$15,616.00	\$28,548.00
	Storm Stainless Steel Grating trench drain at sitewalk 6" wide	244	LF	\$64.00	\$15,616.00	\$15.00	\$3,660.00	\$19,276.00
	Storm Drainage				\$0.00		\$0.00	\$0.00
	8" Diameter Drain Pipe from Tank	135	LF	\$130.00	\$17,550.00	\$48.00	\$6,480.00	\$24,030.00
	12" pipe for storm water piping connect to the street	120	LF	\$214.50	\$25,740.00	\$287.00	\$34,440.00	\$60,180.00
	6" Pipe for Trench to Manhole Connections	45	LF	\$86.50	\$3,892.50	\$46.00	\$2,070.00	\$5,962.50
	Manholes 2ea	1	LS	\$16,800.00	\$16,800.00	\$11,850.00	\$11,850.00	\$28,650.00
	ConEd Vaults/Conduits				\$0.00		\$0.00	\$0.00
	2" Electrical Conduit	0	LF		\$0.00		\$0.00	\$0.00
	Subtotal				\$117,323.50		\$95,346.00	\$212,669.50



Project: Spring Street Salt Shed
 Location: 553 Canal Street, New York NY 10013
 Bidder:

CONTRACT 1 - General Construction

DDC ID: S195-227S
 Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
02505	Leakage Tests (Included w/ 02504)							
02745	Cast Laminated Glass Pavers Discinctive (Laminated Textured Glass Panel) Paving at Lighting fixtures	1,348	SF	\$355.00	\$478,540.00	\$4.00	\$5,392.00	\$483,932.00
	Add Distinctive (Laminated Textured Glass Panel) Paving at lighting fixtures	48	SF	\$60.00	\$2,880.00		\$0.00	\$2,880.00
	Subtotal				\$481,420.00		\$5,392.00	\$486,812.00
02762	Traffic Paint Pavement Marking (Included w/ 02771)							
02771	Concrete Curbs, Headers, and Sidewalks Site Slab on Grade -36" thick, 6000 psi Reinforcement Epoxy Coated - #9@12 EW T. & B. Formwork Pourus Fill - 12" Remove Existing Sidewalks Saw cut Concrete Road Base Full Depth @ Curb Remove Existing Steel Faced Curb Curbs (Steel Faced Concrete) New Sidewalk Access Driveways Miscellaneous protection Street 5' restoration	735 45 2,636 193 7,040 415 305 200 5,270 2,121 1	CY TONS SF CY SF LF LF SF SF LS	\$156.00 \$1,573.00 \$15.00 \$80.00 \$1.75 \$5.00 \$43.00 \$4.50 \$6.00	\$114,660.00 \$70,785.00 \$39,540.00 \$15,440.00 \$12,320.00 \$0.00 \$1,525.00 \$8,600.00 \$23,715.00 \$12,726.00 \$0.00	\$40.00 \$1,716.00 \$31.00 \$45.00 \$0.50 \$18.25 \$25.50 \$114.00 \$6.50 \$7.00 \$0.00	\$29,400.00 \$77,220.00 \$81,716.00 \$8,685.00 \$3,520.00 \$7,573.75 \$7,777.50 \$22,800.00 \$34,255.00 \$14,847.00 \$0.00	\$144,060.00 \$148,005.00 \$121,256.00 \$24,125.00 \$15,840.00 \$7,573.75 \$9,302.50 \$31,400.00 \$57,970.00 \$27,573.00 \$0.00
	Site Retaining Walls Excavation and Back fill (Included w/ 02200)	2,075	SF	\$6.00	\$12,450.00	\$11.00	\$22,825.00	\$35,275.00
	Wall @ Adjacent Holland Tunnel Ventilation Building (10' x 12" x 140 LF) CIP Concrete Formwork Steel Reinforcement Pre-cast copping	59 3,060 3 152	CY SFCA TONS LF	\$149.00 \$3.50 \$1,633.00 \$87.00	\$8,791.00 \$10,710.00 \$4,899.00 \$13,224.00	\$157.50 \$21.00 \$2,173.00 \$60.00	\$9,292.50 \$64,260.00 \$6,519.00 \$9,120.00	\$18,083.50 \$74,970.00 \$11,418.00 \$22,344.00
	Subtotal				\$349,385.00		\$399,610.75	\$749,195.75



Project: Spring Street Salt Shed
 Location: 553 Canal Street, New York NY 10013
 Bidder:

CONTRACT 1 - General Construction
 DDC ID: S195-227S
 Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
02780	Unit Pavers							
	Landscaping							
	New Street Trees Gleidisia Triacanthos 3"-3 1/2 cal.	7	EA	\$1,147.00	\$8,029.00	\$1,509.00	\$10,563.00	\$18,592.00
	Belgian block pavers around trees	600	EA	\$24.00	\$14,400.00	\$19.00	\$11,400.00	\$25,800.00
	Wicket Fence around the trees	280	EA	\$73.00	\$20,440.00	\$48.00	\$13,440.00	\$33,880.00
	Plants/Top soil/Maintenance 3 month per L-201	1	LS	\$2,035.00	\$2,035.00	\$3,050.00	\$3,050.00	\$5,085.00
	Subtotal				\$44,904.00		\$38,453.00	\$83,357.00
02826	Decorative Metal Fences and Gates							
	Gates		EA		\$0.00		\$0.00	\$0.00
	Mobilize		LS		\$0.00		\$0.00	\$0.00
	Custom Painted Steel Fence to match gate - 8' tall		LF		\$0.00		\$0.00	\$0.00
	Aluminum gates per A-404		EA		\$0.00		\$0.00	\$0.00
	Subtotal				\$150,846.00		\$0.00	\$150,846.00
02930	Exterior Plants (included w/ 02780)							
Division 3	CONCRETE							
03100	Concrete Forms and Accessories (Included w/ 03300)							
03200	Concrete Reinforcement (Included w/ 03300)							
03300	Cast-In-Place Structural Concrete							
	Mat Slab - 42" Thick, 6000 psi	991	CY	\$287.00	\$284,417.00	\$88.00	\$87,208.00	\$371,625.00
	Reinforcement							
	#10 @ 12 E.W. Top Bars	47	TONS	\$1,643.00	\$77,221.00	\$2,638.00	\$123,986.00	\$201,207.00
	#9 @ 12 Bottom Bars	33	TONS	\$1,644.00	\$54,252.00	\$2,845.00	\$93,885.00	\$148,137.00
	Additional #10 @ 6" along walls	26	TONS	\$1,645.00	\$42,770.00	\$2,847.00	\$74,022.00	\$116,792.00
	Formwork	2,448	SF	\$15.00	\$36,720.00	\$35.50	\$86,904.00	\$123,624.00
	Pourus Fill - 12"	263	CY	\$58.00	\$15,254.00	\$32.00	\$8,416.00	\$23,670.00



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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Grade Beam/Haunch	63	CY	\$233.00	\$14,679.00	\$134.00	\$8,442.00	\$23,121.00
	CIP Concrete, 6000 psi							
	Reinforcement							
	#5 Epoxy Covered Stirrups @ 12"	5	TONS	\$1,352.00	\$6,760.00	\$1,786.00	\$8,930.00	\$15,690.00
	#8 Epoxy Covered Horizontal Bars	14	TONS	\$1,353.00	\$18,942.00	\$1,759.00	\$24,626.00	\$43,568.00
	Formwork perimeter 3'x4' additional to the mat slab	429	SF	\$10.00	\$4,290.00	\$32.00	\$13,728.00	\$18,018.00
	Cast-in-place Concrete Walls							
	CIP Concrete (6000 psi)	2,655	CY	\$258.00	\$684,990.00	\$217.00	\$576,135.00	\$1,261,125.00
	Formwork with support for Architecture finished	18,932	SF	\$123.00	\$2,328,636.00	\$79.75	\$1,509,827.00	\$3,838,463.00
	Formwork inside of the building	19,983	SF	\$50.25	\$1,004,145.75	\$32.00	\$639,456.00	\$1,643,601.75
	Architectural Finish Lining on Façade Exterior Wall	18,932	SF	\$2.00	\$37,864.00	\$1.55	\$29,344.60	\$67,208.60
	Reinforcement epoxy coated	137	TONS	\$1,569.00	\$214,953.00	\$1,980.00	\$271,260.00	\$486,213.00
	Anchors/dowels for embeds in footing	1	LS	\$3,407.00	\$3,407.00	\$4,296.00	\$4,296.00	\$7,703.00
	CIP concrete at roof level 12"x24" S-116	2	CY	\$2,204.00	\$4,408.00	\$3,888.00	\$7,776.00	\$12,184.00
	Winter Weather	1	LS	\$198,475.00	\$198,475.00	\$0.00	\$0.00	\$198,475.00
	Housekeeping/Mech Pads	1	LS	\$198,475.00	\$198,475.00	\$0.00	\$0.00	\$198,475.00
	Built-ins / Embeds	1	LS	\$198,475.00	\$198,475.00	\$0.00	\$0.00	\$198,475.00
	Crane/man lift	1	LS	\$198,476.00	\$198,476.00	\$0.00	\$0.00	\$198,476.00
	Subtotal				\$5,627,609.75		\$3,568,241.60	\$9,195,851.35
03330	Architectural Cast-in-Place Concrete (Included w/ 03300)							
03350	Concrete Finishes							
	Grouting							
	Welded Wire Mesh - 6x6 - W4.0xW4.0 W.W.F. @ Roof Level	8,323	SF	\$1.50	\$12,484.50	\$2.50	\$20,807.50	\$33,292.00
	2" Thick Grout Topping for Precast Concrete Panels @ Roof Level	7,566	SF	\$3.00	\$22,698.00	\$3.50	\$26,481.00	\$49,179.00
	3" MIN (9" MAX) High Strength Grout Topping @ Ground Level	6,340	SF	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	SS Wire Mesh @ Ground Level	6,340	SF	\$1.50	\$9,510.00	\$1.50	\$9,510.00	\$19,020.00
	Subtotal				\$44,692.50		\$56,798.50	\$101,491.00



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03411	Precast Concrete Hollow Core Planks							
	Scaffolding		SF	\$0.00	\$0.00		\$0.00	\$0.00
	Precast Concrete Panels 6" thick supply only	8,100	SF	\$12.00	\$97,200.00		\$0.00	\$97,200.00
	Install and support pre-cast plank	120	EA	\$70.50	\$8,460.00	\$1,045.00	\$125,400.00	\$133,860.00
	Subtotal				\$105,660.00		\$125,400.00	\$231,060.00
Division 4	MASONRY							
04851	Masonry/ Stone							
	Granite stone 1" thick at sitewalk level at exterior wall	500	SF	\$48.25	\$24,125.00	\$72.50	\$36,250.00	\$60,375.00
	Subtotal				\$24,125.00		\$36,250.00	\$60,375.00
Division 5	METALS							
05120	Structural Steel							
	Roof Plate Girders (PG1 - PG5, W18)	50	TON	\$5,434.00	\$271,700.00	\$2,174.00	\$108,700.00	\$380,400.00
	Connections (10%)	5	TON	\$5,072.00	\$25,360.00	\$3,381.00	\$16,905.00	\$42,265.00
	Subtotal				\$297,060.00		\$125,605.00	\$422,665.00
05500	Metal Fabrications							
	Pre-cast panel support(tube/anchors/welding)	2	TON	\$3,020.00	\$6,040.00	\$1,508.00	\$3,016.00	\$9,056.00
	Misc Framing at Openings	1	LS	\$6,035.00	\$6,035.00	\$3,020.00	\$3,020.00	\$9,055.00
	Stain Steel roof cable rails	150	LF	\$80.50	\$12,075.00	\$161.00	\$24,150.00	\$36,225.00
	Catwalk at roof level	18	SF	\$670.00	\$12,060.00	\$940.00	\$16,920.00	\$28,980.00
	12" Bollard - Concrete filled steel pipe	9	EA	\$1,610.00	\$14,490.00	\$2,281.00	\$20,529.00	\$35,019.00
	Subtotal				\$50,700.00		\$67,635.00	\$118,335.00
05510	Exterior Metal Stairs (Included w/ 05500)							
05532	Stainless Steel Floor Grating and Plate							
	Stainless Steel Enclosure for the electrical panel (A-304/A-403)	1	LS	\$3,864.00	\$3,864.00	\$966.00	\$966.00	\$4,830.00
	Stainless Steel Canopy @ Electrical Panels (2 loc)	64	SF	\$0.00	\$0.00		\$0.00	\$0.00
	Add 1" Thick, 8' High Corten Plates @ Interior Perimeter(Supply \$1.5per/lbs)	2,800	SF	\$51.00	\$142,800.00	\$76.00	\$212,800.00	\$355,600.00
	Subtotal				\$146,664.00		\$213,766.00	\$360,430.00



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05730	Decorative Metal Railings (Included w/ 05500)							
Division 6	WOODS AND PLASTICS							
06100	Rough Carpentry		GSF	\$0.00	\$0.00		\$0.00	\$0.00
	Rough Carpentry			\$0.00	\$0.00		\$0.00	\$0.00
	Subtotal							
Division 7	THERMAL AND MOISTURE PROTECTION							
07124	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing	8,100	SF	\$16.00	\$129,600.00	\$23.50	\$190,350.00	\$319,950.00
	EPDM Membrane roofing on 2 layers of recovery boards	8,100	SF	\$1.50	\$12,150.00	\$3.00	\$24,300.00	\$36,450.00
	2" Thick Rubber Pavers							
	Wall expansion cover joint and plate pea A-402/11 at existing building and retaining wall	220	LF	\$71.00	\$15,620.00	\$110.00	\$24,200.00	\$39,820.00
	Subtotal				\$157,370.00		\$238,850.00	\$396,220.00
07130	Foundation Waterproofing							
	Bituminous Sheet - 56-mil rubberized asphalt laminate, 4-mil PE film	10,880	SF	\$5.00	\$54,400.00	\$6.00	\$65,280.00	\$119,680.00
	Subtotal				\$54,400.00		\$65,280.00	\$119,680.00
07620	Sheetmetal Flashing and Trim							
	Aluminum Metal flashing	200	LF	\$60.00	\$12,000.00	\$88.00	\$17,600.00	\$29,600.00
	Subtotal				\$12,000.00		\$17,600.00	\$29,600.00
07720	Roof Accessories (Included w/ 07124)							
07920	Joint Sealants (Included w/ 03330)							
07921	Concrete Paving Joint Sealants (Included w/ 02745)							



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Division 8	DOORS AND WINDOWS							
08331	Overhead Coiling Doors							
	SS frame type 316 around opening for the door	83	LF	\$922.00	\$76,526.00	\$245.00	\$20,335.00	\$96,861.00
	Roll Up Door Stainless Steel 31'x21' (McKeon Door)	651	SF	\$480.00	\$312,480.00	\$41.00	\$26,691.00	\$339,171.00
	Add for increase the size of the door to 24' wide		SF		\$0.00		\$0.00	\$0.00
	Subtotal				\$389,006.00		\$47,026.00	\$436,032.00
08391	Flood Barriers							
	Flood Gate (A-601)	1	LS	\$23,500.00	\$23,500.00	\$5,800.00	\$5,800.00	\$29,300.00
	Subtotal				\$23,500.00		\$5,800.00	\$29,300.00
08620	Unit Skylights							
	Unit Skylight - Typical	5	EA	\$8,300.00	\$41,500.00	\$7,030.00	\$35,150.00	\$76,650.00
	Subtotal				\$41,500.00		\$35,150.00	\$76,650.00
Division 9	FINISHES							
09960	High Performance Coating							
	Painting of exposed structural steel	4,185	SF	\$0.55	\$2,301.75	\$5.35	\$22,389.75	\$24,691.50
	Scaffolding/scissor lift	1	LS		\$0.00		\$0.00	\$0.00
	Subtotal				\$2,301.75		\$22,389.75	\$24,691.50
Division 10	SPECIALTIES							
10522	Fire Extinguishers							
	Fire Extinguishers	2	EA	\$455.00	\$910.00	\$450.00	\$900.00	\$1,810.00
	Subtotal				\$910.00		\$900.00	\$1,810.00
Division 13	SPECIAL CONSTRUCTION							
13210	Underground Storage Tanks							
	Rainwater Collection Tank							
	Excavation	286	CY	\$70.00	\$20,020.00	\$52.00	\$14,872.00	\$34,892.00
	Carling	286	CY	\$34.00	\$9,724.00		\$0.00	\$9,724.00
	Concrete Foundation Mat - 3/6" Thick	44	CY	\$216.00	\$9,504.00	\$121.00	\$5,324.00	\$14,828.00
	Concrete Walls - 1' 6" Thick	58	CY	\$130.00	\$7,540.00	\$65.00	\$3,770.00	\$11,310.00
	Formwork	3,754	SF	\$2.50	\$9,385.00	\$12.00	\$45,048.00	\$54,433.00
	Reinforcement	13	TONS	\$1,569.00	\$20,397.00	\$1,764.00	\$22,932.00	\$43,329.00



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	Storm Water Retention Tank Allowance (6,000 Gallons)	1	LS	\$39,850.00	\$39,850.00	\$10,580.00	\$10,580.00	\$50,430.00
	CaCl Tank Wall/ Enclosure one side	29	CY	\$347.00	\$10,063.00	\$252.00	\$7,308.00	\$17,371.00
	CIP Concrete Formwork	737	SFCA	\$17.00	\$12,529.00	\$13.00	\$9,581.00	\$22,110.00
	Steel Reinforcement	1	TONS	\$22,560.00	\$22,560.00	\$17,080.00	\$17,080.00	\$39,640.00
	Subtotal				\$161,572.00		\$136,495.00	\$298,067.00
Division 15	MECHANICAL							
15050	Basic Mechanical Materials and Methods							
	Temporary Heat	1	LS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Rigging, Hoisting & Lifts	1	LS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Testing & Inspections	1	LS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	System Identification	1	LS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Sleeves & Fire Stopping	1	LS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Equipment Startup	1	LS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Misc. Control Wiring for Tanks	1	LS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Subtotal				\$33,000.00		\$0.00	\$33,000.00
15051	Ductile Iron Pipe (Included w/ 15160)							
15060	Hangers and Supports (Included w/ 15160)							
15081	Piping Insulation (Included w/ 15160)							
15120	Interior and Exposed Piping Schedule (Included w/ 15180)							
15160	Storm Drainage Piping and Vents							
	Roof Drains		EA		\$0.00		\$0.00	\$0.00
	Overflow Drains		EA		\$0.00		\$0.00	\$0.00
	Storm Drainage Piping		LF		\$0.00		\$0.00	\$0.00
	Add Storm Drainage Piping		LF		\$0.00		\$0.00	\$0.00
	Insulation for Horizontal Pipe		LF		\$0.00		\$0.00	\$0.00



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	Overflow Drainage Riser		LF	\$0.00			\$0.00	\$0.00
	Vent Piping		LF	\$0.00			\$0.00	\$0.00
	Misc. Accessories & Specialties	1	LS	\$0.00			\$0.00	\$0.00
	Sump Pump storm water	1	LS	\$0.00			\$0.00	\$0.00
	Piping for the above pumps	1	LS	\$0.00			\$0.00	\$0.00
	Subtotal				\$43,000.00		\$0.00	\$43,000.00
15430	Plumbing Specialties							
	Misc. Valves & Specialties	1	LS	\$1,000.00	\$1,000.00		\$0.00	\$1,000.00
	Subtotal				\$1,000.00		\$0.00	\$1,000.00
15810	Ductwork							
	Ventilation System							
	Stainless Steel Ductwork for 5 Fans and air intake		LBS	\$0.00			\$0.00	\$0.00
	Duct Insulation (250 sf)	1	LS	\$0.00			\$0.00	\$0.00
	Motorized Dampers		SF	\$0.00			\$0.00	\$0.00
	Backdraft Dampers		SF	\$0.00			\$0.00	\$0.00
	Grilles, Registers, & Diffusers - Stainless Steel		EA	\$0.00			\$0.00	\$0.00
	OAI Penitence Louver	1	LS	\$0.00			\$0.00	\$0.00
	Exhaust/OAI Louvers (assume Galvanized)		SF	\$0.00			\$0.00	\$0.00
	Subtotal				\$35,750.00		\$0.00	\$35,750.00
15820	Ductwork Accessories							
	Miscellaneous S.S. Sheetmetal Supports & Accessories		LS	\$14,250.00	\$14,250.00		\$0.00	\$0.00
	Subtotal				\$14,250.00		\$0.00	\$14,250.00
15830	Fans							
	Salt Storage Shed Exhaust Fans EAF-2 to EAF-4 (4 @ 3,800 cfm ea)		EA	\$0.00			\$0.00	\$0.00
	Salt Storage Shed Exhaust Fan EAF-5 (1,000 cfm)		EA	\$0.00			\$0.00	\$0.00
	Electrical Room Exhaust Fan EAF-6 (350 cfm)		EA	\$0.00			\$0.00	\$0.00
	Motor Starter/Disconnect Switch		EA	\$0.00			\$0.00	\$0.00
	Subtotal				\$35,000.00		\$0.00	\$35,000.00



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15950	Testing, Adjusting, and Balancing Local Thermostats for Exhaust Fans		LS		\$0.00		\$0.00	\$0.00
	Start-up, Testing & Commissioning		LS		\$0.00		\$0.00	\$0.00
	Subtotal				\$13,000.00		\$0.00	\$13,000.00
Division 16	ELECTRICAL							
16020	Temporary Electrical System							
	Temporary Power and Light		GSF		\$0.00		\$0.00	\$0.00
	Subtotal				\$0.00		\$0.00	\$0.00
16050	Basic Electrical Materials and Methods (Included w/ 16130)							
16055	Electrical Requirements for Shop-Assembled Equipment (Included w/ 16130)							
16060	Grounding							
	Grounding		GSF		\$0.00		\$0.00	\$0.00
	Subtotal				\$0.00		\$0.00	\$0.00
16071	Supporting Devices (Included w/ 16130)							
16075	Electrical Identification (Included w/ 16130)							
16080	Electrical Testing Requirements (Included w/ 16130)							



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16121	Wires and Cables-600 Volts and Below							
	Fire Alarm	1	EA	\$5,633.00	\$5,633.00	\$11,266.00	\$11,266.00	\$16,899.00
	Smoke Detectors	1	EA	\$5,633.00	\$5,633.00	\$11,266.00	\$11,266.00	\$16,899.00
	Manual Pull Stations	1	LS	\$5,633.00	\$5,633.00	\$11,266.00	\$11,266.00	\$16,899.00
	Fan Start-up/Status/Shutdown Relay	1	LS	\$5,633.00	\$5,633.00	\$11,266.00	\$11,266.00	\$16,899.00
	Tempered Switch	1	LS	\$5,633.00	\$5,633.00	\$11,266.00	\$11,266.00	\$16,899.00
	Testing/Programming/Software	1	LS	\$5,633.00	\$5,633.00	\$11,266.00	\$11,266.00	\$16,899.00
	Subtotal				\$28,165.00		\$56,330.00	\$84,495.00
16130	Electrical Raceway Systems							
	Service & Distribution							
	Feeders and Conduit from POS to Electrical Room (1) 2" RGS Raceway	20	LF	\$71.00	\$1,420.00	\$142.00	\$2,840.00	\$4,260.00
	Concrete Encased				\$0.00		\$0.00	\$0.00
	Increase feeders and conduit to 4-4/0 in 3" EC	1	EA	\$3,622.00	\$3,622.00	\$1,207.00	\$1,207.00	\$4,829.00
	Service End Box				\$0.00		\$0.00	\$0.00
	Splices	1	EA	\$345.00	\$345.00	\$417.00	\$417.00	\$762.00
	Grounding	1	EA	\$6,034.00	\$6,034.00	\$6,085.00	\$6,085.00	\$12,119.00
	Generator Tap Box (NEMA 4X)	1	EA	\$2,930.00	\$2,930.00	\$880.00	\$880.00	\$3,810.00
	Kirk Key interlock	1	EA	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Surge Protection Device							
	Normal Elec & Feeders							
	Fdrs from PP-1 to Lp-1, LP-2 (4#1+#8GND in 1-1/4"RGS)	20	LF	\$150.00	\$3,000.00	\$176.00	\$3,520.00	\$6,520.00
	Furnish and install GMCC-1	1	EA	\$12,677.00	\$12,677.00	\$8,366.00	\$8,366.00	\$21,043.00
	NEMA 4X enclosure	1	EA	\$5,727.00	\$5,727.00	\$898.00	\$898.00	\$6,625.00
	Fdrs from PP-1 to GMCC-1 (4#1+#8GND in 1-1/4"RGS)	50	LF	\$20.00	\$1,000.00	\$42.00	\$2,100.00	\$3,100.00
	Fdrs from PP-1 to Generator Tap Box	80	LF	\$83.00	\$6,640.00	\$99.00	\$7,920.00	\$14,560.00
	Electrical Panels							
	Furnish and install 2 100A distribution panels (LP-1)	2	EA	\$4,829.00	\$9,658.00	\$3,693.00	\$7,386.00	\$17,044.00
	NEMA 4X enclosure for LP-1	2	EA	\$2,920.00	\$5,840.00	\$0.00	\$0.00	\$5,840.00
	Furnish Main Service 200A Sqitch Bd PP-1	1	EA	\$22,486.00	\$22,486.00	\$9,802.00	\$9,802.00	\$32,288.00
	Increased size to 250A bus and 225A MCB	1	EA	\$3,018.00	\$3,018.00	\$0.00	\$0.00	\$3,018.00
	NEMA 4X enclosure for PP-1	1	EA	\$11,455.00	\$11,455.00	\$0.00	\$0.00	\$11,455.00
	Subtotal				\$95,952.00		\$51,421.00	\$147,373.00



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16132	Underground Electrical Distribution System (Included w/ 16210)							
16140	Wiring Devices	0	EA		\$0.00		\$0.00	\$0.00
	Duplex Outlets	15	EA	\$82.00	\$1,230.00	\$152.00	\$2,280.00	\$3,510.00
	Duplex Outlets (WP)		EA		\$0.00		\$0.00	\$0.00
	Duplex Outlets (Floor)		EA		\$0.00		\$0.00	\$0.00
	All receptacles to be GFCI and weather proof	1	EA	\$815.00	\$815.00	\$724.00	\$724.00	\$1,539.00
	Add GFCI WP receptacles on roof	15	LF	\$537.00	\$8,055.00	\$1,349.00	\$20,235.00	\$28,290.00
	Wiring	140	MH		\$0.00	\$6.90	\$966.00	\$966.00
	Installation				\$10,100.00		\$24,205.00	\$34,305.00
	Subtotal							
16210	Electrical Service							
	Connection to EAF-1 (1 HP per elec)	1	EA	\$69.00	\$69.00	\$220.00	\$220.00	\$289.00
	Feeder from GMCC-1 to EAF	240	LF	\$25.00	\$6,000.00	\$52.00	\$12,480.00	\$18,480.00
	Connection to EAF-2 (1 HP per elec)	1	EA	\$70.00	\$70.00	\$220.00	\$220.00	\$290.00
	Feeder from GMCC-1 to EAF	150	LF	\$20.00	\$3,000.00	\$49.00	\$7,350.00	\$10,350.00
	Connection to EAF-3 (1 HP per elec)	1	EA	\$70.00	\$70.00	\$220.00	\$220.00	\$290.00
	Feeder from GMCC-1 to EAF	150	LF	\$16.00	\$2,400.00	\$49.00	\$7,350.00	\$9,750.00
	Connection to EAF-4 (1 HP per elec)	1	EA	\$70.00	\$70.00	\$220.00	\$220.00	\$290.00
	Feeder from GMCC-1 to EAF	180	LF	\$18.00	\$3,240.00	\$59.00	\$10,620.00	\$13,860.00
	Connection to EAF-5 (1 HP per elec)	1	EA	\$70.00	\$70.00	\$220.00	\$220.00	\$290.00
	Feeder from GMCC-1 to EAF	225	LF	\$15.00	\$3,375.00	\$44.00	\$9,900.00	\$13,275.00
	Connection to EAF-6 (1 HP per elec)		LS		\$0.00		\$0.00	\$0.00
	Feeder from GMCC-1 to EAF		EA		\$0.00		\$0.00	\$0.00
	Connection to Gate 1 (Disconnect switch only)	1	EA	\$1,544.00	\$1,544.00	\$940.00	\$940.00	\$2,484.00
	Feeder from PP-1 to Gate 1	95	LF	\$7.00	\$665.00	\$18.00	\$1,710.00	\$2,375.00
	Connection to Gate 2 (Disconnect switch only)	1	EA	\$1,544.00	\$1,544.00	\$940.00	\$940.00	\$2,484.00
	Feeder from PP-1 to Gate 2	120	LF	\$6.00	\$720.00	\$16.00	\$1,920.00	\$2,640.00
	Connection to Stormwater Pump	1	EA	\$70.00	\$70.00	\$220.00	\$220.00	\$290.00



NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

CONTRACT 1 - General Construction

Project: Spring Street Salt Shed
 Location: 553 Canal Street, New York NY 10013
 Bidder:

DDC ID: S195-227S
 Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Feeder from PP-1 to Stormwater Pump	45	LF	\$16.00	\$720.00	\$48.00	\$2,160.00	\$2,880.00
	Connection to Door 1 (Disconnect Switch only)	1	EA	\$1,540.00	\$1,540.00	\$940.00	\$940.00	\$2,480.00
	Feeder from PP-1 to Door 1	65	LF	\$17.00	\$1,105.00	\$45.00	\$2,925.00	\$4,030.00
	Connection to Pump 1	1	EA	\$1,545.00	\$1,545.00	\$940.00	\$940.00	\$2,485.00
	Feeder from PP-1 to Pump	60	LF	\$8.00	\$480.00	\$19.00	\$1,140.00	\$1,620.00
	Connection to Pump 2	1	EA	\$1,545.00	\$1,545.00	\$940.00	\$940.00	\$2,485.00
	Feeder from PP-1 to Pump	50	LF	\$10.00	\$500.00	\$22.50	\$1,125.00	\$1,625.00
	Add connection to motorized damper	1	LS	\$1,545.00	\$1,545.00	\$940.00	\$940.00	\$2,485.00
	Add feeder to motorized damper	160	LF	\$15.00	\$2,400.00	\$42.50	\$6,800.00	\$9,200.00
	NEMA 4X enclosure for all disconnect switches		EA		\$0.00		\$0.00	\$0.00
	Subtotal				\$34,287.00		\$72,440.00	\$106,727.00
16220	Electric Motors (Included w/ 16210)							
16411	Disconnect Switches (Included w/ 16210)							
16443	Panelboards (Included w/ 16130)							
16491	Control Components and Devices (Included w/ 16500)							
16500	Lighting Equipment Lamps and Ballasts							
	All light fixtures	1	LS	\$147,300.00	\$147,300.00		\$0.00	\$147,300.00
	All light fixtures - adjustment	1	LS	\$5,727.00	\$5,727.00		\$0.00	\$5,727.00
	Add Type F1 Light pole	1	EA	\$4,795.00	\$4,795.00	\$4,190.00	\$4,190.00	\$8,985.00



Project: Spring Street Salt Shed
 Location: 553 Canal Street, New York NY 10013
 Bidder:

CONTRACT 1 - General Construction

DDC ID: S195-227S
 Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Exit Lighting		EA	\$0.00	\$0.00		\$0.00	\$0.00
	LCP-1, LCP-2	2	EA	\$5,203.00	\$10,406.00	\$3,342.00	\$6,684.00	\$17,090.00
	Additional Lighting Wiring (building)	1	LF	\$170.00	\$170.00	\$320.00	\$320.00	\$490.00
	Lighting Wiring (building)	400	LF	\$170.00	\$68,000.00	\$320.00	\$128,000.00	\$196,000.00
	Additional Lighting Wiring (in-ground watertight)	1	LF	\$17.00	\$17.00	\$35.00	\$35.00	\$52.00
	Lighting Wiring (in-ground watertight)	600	LF	\$17.00	\$10,200.00	\$35.00	\$21,000.00	\$31,200.00
	Lighting Installation (Allowance)	238	MH		\$0.00		\$0.00	\$0.00
	Additional Lighting Installation (Allowance)		MH		\$0.00		\$0.00	\$0.00
	Subtotal				\$246,615.00		\$160,229.00	\$406,844.00
16600	Lighting Control System (Included w/ 16500)							
	TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK				\$11,890,498.65		\$6,517,315.35	\$18,407,814.00

A. PROJECT REFERENCES – SIMILAR CONTRACTS COMPLETED BY THE BIDDER

List all contracts substantially completed within the last 5 years similar to the contract being awarded, 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
Project Name: A-35942/43/26 Rehabilitation of Bleecker St. and Broadway-Lafayette Complex Location: E. Houston St. & Lafayette St. New York, NY	Subcontractor	\$19,500,000	Nov. 2012	Owner: MTA/NYCTA 2 Broadway New York, NY 10004 Contact: Samson Abraham 212-253-2090	Weidinger Associates, Inc. 40 Wall Street New York, NY 10005 212-367-3000
Project Name: C-26511 Construction of a Ventilation Building Structure: and Reconstruction of 11 th Ave. and W. 36 th St. at Site K Location: 11 th Ave. & W. 36 th St. New York, NY	Prime (Joint Venture)	\$57,882,000	Nov. 2012	Owner: MTA/NYCTA 2 Broadway New York, NY 10004 Contact: Sammy Mercado 347-301-3701	Parsons Brinckerhoff Americas, Inc. One Penn Plaza New York, NY 10119 212-465-5000
Project Name: NYHS Auditorium NYHS Stage 2, Phase 5 Location: 170 Central Park West New York, NY 10024	Prime	\$947,783	Nov. 2011	Owner: NY Historical Society 170 Central Park West New York, NY 10024 Contact: Susan Berotti 212-983-7150	Platt Byard Dove White 20 W. 22 nd Street New York, NY 10010 212-691-2440

PRE AWARDED SHEET
S195-227S

Project Name: Lexington House Hotel Location: 511 Lexington Ave New York, NY 10017	Prime/ Subcontractor	\$10,400,000	Sept. 2010	Owner: 44 Lexington Assoc. LLC Contact: Hareesh Majmudar 917-902-7616	ADGI 744 Broad St. Newark, NJ 07102 212-288-7120
Project Name: Fort Hamilton AFRC & Maintenance Building Location: Fort Hamilton Army base Brooklyn, NY	Subcontractor	\$4,033,000	May 2010	Owner: Army Corp of Engineers Contact: Dan Decarlo 585-406-0078	RSP Architects 350 West Hubbard Chicago, IL 60654 312-925-5367
Project Name: East River Plaza Location: 116 th Street and FDR Drive New York, NY	Subcontractor	\$3,002,000	Feb. 2010	Owner: Tiago Holdings Contact: Grady Humprey 631-831-5162	Philip Habib & Associates 226 West 26 th St. New York, NY 10001
Project Name: Hampton Inn @ LaGuardia Airport Location: 102-40 Ditmars Blvd East Elmhurst, NY 11369	Subcontractor	\$3,000,000	Jul. 2009	Owner: Express Airport Developers Contact: Martin Field 484-253-1633	Desimone 18 West 18 th Street New York, NY 10011 212-532-2211
Project Name: Target Brooklyn College Location: East Elmhurst, NY 11369	Subcontractor	\$73,750,000	Mar. 2008	Owner: Target Corp./ Triangle Equities Contact: Michael McAleer 201-320-2926	Desimone 18 West 18 th Street New York, NY 10011 212-532-2211

PRE AWARDED SHEET
S195-227S

B. PROJECT REFERENCES – CONTRACTS CURRENTLY UNDER CONSTRUCTION BY 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 Completion	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. if different from owner
Project Name: E-34020 Replacement of 3 Escalators at 3 Locations Location: Bowery, E. Broadway and Whitehall Stations New York, NY	Prime	\$6,799,977	\$4,407,025	\$1,786,773	Dec. 2013	Owner: NYCT Contact: Dillip Patel 646-252-3644	NYCTA
Project Name: C-33090 Two new Bus Washers at LaGuardia Bus Depot Location: 8501 24th Ave, Flushing, NY 11370	Prime	\$1,878,513	\$1,050,430	\$413,205	Oct. 2013	Owner: MTA Bus Company Contact: Leonid Geldman 347-386-7457	MTA Bus Company
Project Name: A-36117 Installation of ADA Elevators at Hunts Point Station Location: Bronx, NY	Prime	\$6,273,698	\$3,318,225	\$3,012,984	Mar. 2014	Owner: NYCT Contact: Abdul Muqtadir 646-252-4668	NYCTA

**PRE AWARDED SHEET
S195-227S**

<p>Project Name: PS70 New Addition & ADA upgrades to Existing School</p> <p>Location: 42nd Street Astoria, NY</p>	<p>Subcontractor</p>	<p>\$3,300,000</p>	<p>\$85,000</p>	<p>\$1,276,825</p>	<p>Oct. 2013</p>	<p>Owner: NYCSCA</p> <p>Contact: Frank Pagano fpagano@nycsca.org</p>	<p>Rothzeit Kaiserman Thomson & Bee Architects</p> <p>150 W. 22nd St. New York, NY 10011 212-807-9500</p>
<p>Project Name: WTC-324.359.04 WTC Streets, Utilities & Related Infrastructure – Phase II, Package 4</p> <p>Location: WTC- Tower 1</p>	<p>Prime</p>	<p>\$14,486,716</p>	<p>\$1,969,190</p>	<p>\$13,277,990</p>	<p>Oct. 2014</p>	<p>Owner: PANY&NJ</p> <p>Contact: Timothy Croke 212-535-4242</p>	<p>World Trade Center Engineering Department</p>

**PRE AWARDED SHEET
\$195-227S**

C. PROJECT REFERENCES – 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
Project Name: WTC-744.280.01 WTC VSC-RN- Concrete & Reinforcing Steel Location: World Trade Center, NY	Prime	\$5,375,585	Sept. 2013	Owner: PANYNJ Contact: Ken Hahn 646-837-8518	World Trade Center Engineering Department
Project Name: C-26011 Construction of Part of Second Ave. Subway Rt. 132A-72 nd Street Station, Ancillary Building and Entrances Location: 72 nd Street Station, NYC	Subcontractor (50% partner of a JV)	\$14,112,380	Dec. 2013	Owner: NYCT Contact: Don Hickey 718-554-2320	
Project Name: WTC-244.080.06 General Construction Services at the World Trade Center Site on a Work Order Basis Location: World Trade Center, NY	Prime	N/A (no work order has been issued yet)	July 2013	Owner: PANYNJ Contact:	World Trade Center Engineering Department

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.

1. Bidder Information:

Company Name: Oliveira Contracting, Inc.

DDC Project Number: S195-227S

Company Size: Ten (10) employees or less
 X Greater than ten (10) employees

 No Company has previously worked for DDC

2. Type(s) of Construction Work

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

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 contractor may obtain its EMR by contacting its insurance broker or the NCCI. If the contractor cannot obtain its EMR, it must submit a written explanation as to why.

The Contractor 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
2012	1.07	
2011	1.00	
2010	1.00	

If the Intrastate and/or Interstate EMR for any of the past three years is greater than 1.00, the 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:

No Contractor has received a willful violation issued by OSHA or New York City Department of Buildings (NYCDOB) within the last three years.

No Contractor has had an incident requiring OSHA notification within 8 hours (i.e., fatality, or hospitalization of three or more employees).

The Occupational Safety and Health Act (OSHA) of 1970 requires employers with ten or more employees, on a yearly basis to complete and maintain on file the form entitled "Log of Work-related Injuries and Illnesses". This form is commonly referred to as the OSHA 300 Log (OSHA 200 Log for 2001 and earlier).

The OSHA 300 Log must be submitted for the last three years for contractors with more than ten employees.

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

The contractor must submit the Incident Rate for Lost Time Injuries (the Incident Rate) for the past three 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 300 Log. The 200,000 hours represents the equivalent of 100 employees working forty hours a week, fifty weeks per year.

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

YEAR	TOTAL NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE
2012	70,992	2.82
2011	58,774	0.00
2010	112,106	24.98

If the 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 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)

NO Contractor previously audited by the DDC Office of Site Safety.

DDC Project Number(s): _____

NO Accident on previous DDC Project(s).

NO Fatality or Life-altering Injury on DDC Project(s) within the last three years.
 [Examples of a life-altering injury include loss of limb, loss of a sense (e.g., sight, hearing), or loss of neurological function].

Date: 10-9-13

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

Title: President

VENDEX COMPLIANCE

(A) **Vendex Fees:** Pursuant to Procurement Policy Board Rule 2-08(f)(2), the contractor will be charged a fee for the administration of the VENDEX system, including the Vendor Name Check process, if a Vendor Name Check review is required to be conducted by the Department of Investigation. The contractor shall also be required to pay the applicable required fees for any of its subcontractors for which Vendor Name Check reviews are required. The fee(s) will be deducted from payments made to the contractor under the contract. For contracts with an estimated value of less than or equal to \$1,000,000, the fee will be \$175 per Vendor Name Check review. For contracts with an estimated value of greater than \$1,000,000, the fee will be \$350 per Vendor Name Check review.

(B) **Confirmation of Vendex Compliance:** The Bidder shall submit this Confirmation of Vendex Compliance to the Department of Design and Construction, Contracts Section, 30-30 Thomson Avenue – First Floor, Long Island City, NY 11101.

Bid Information: The Bidder shall complete the bid information set forth below.

Name of Bidder: Oliveira Contracting, Inc.
Bidder's Address: 15 Albertson Ave., Albertson, NY 11507
Bidder's Telephone Number: 516-333-6343
Bidder's Fax Number: 516-333-6367
Date of Bid Opening: October 9, 2013
Project ID: S195-227S

Vendex Compliance: To demonstrate compliance with Vendex requirements, the Bidder shall complete either Section (1) or Section (2) below, whichever applies.

(1) **Submission of Vendex Questionnaires to MOCS:** By signing in the space provided below, the Bidder certifies that as of the date specified below, the Bidder has submitted Vendex Questionnaires to the Mayor's Office of Contract Services, Attn: VENDEX, 253 Broadway, 9th Floor, New York, New York 10007.

Date of Submission: _____

By: _____
(Signature of Partner or corporate officer)

Print Name: _____

(2) **Submission of Certification of No Change to DDC:** By signing in the space provided below, the Bidder certifies that it has read the instructions in a "Vendor's Guide to Vendex" and that such instructions do not require the Bidder to submit Vendex Questionnaires. The Bidder has completed **TWO ORIGINALS** of the Certification of No Change set forth on the next page of this Bid Booklet.

By: 
(Signature of Partner or corporate officer)

Print Name: Carmelina Oliveira - President

Certificate of No Change Form

- Please submit two completed forms. Copies will not be accepted.
- Please send both copies to the agency that requested it, unless you are advised to send it directly to the Mayor's Office of Contract Services (MOCS).
- A materially false statement willfully or fraudulently made in connection with this certification, and/or the failure to conduct appropriate due diligence in verifying the information that is the subject of this certification, may result in rendering the submitting entity non-responsible for the purpose of contract award.
- A materially false statement willfully or fraudulently made in connection with this certification may subject the person making the false statement to criminal charges

I, Carmelina Oliveira, being duly sworn, state that I have read
Enter Your Name

and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.

In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.

I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.

Vendor Questionnaire *This section is required.*

This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.

Name of Submitting Entity: Oliveira Contracting, Inc.

Vendor's Address: 15 Albertson Ave., Albertson, NY 11507

Vendor's EIN or TIN: 56-2361008 Requesting Agency: NYCDDC

Are you submitting this Certification as a parent? (Please circle one) Yes No

Signature date on the last full vendor questionnaire signed for the submitting vendor: 7/11/2011

Signature date on change submission for the submitting vendor: _____

Principal Questionnaire

This section refers to the most recent principal questionnaire submissions.



Principal Name	Date of signature on last full Principal Questionnaire	Date(s) of signature on submission of change
1 Carmelina Oliveira	6/30/2011	
2		
3		
4		
5		
6		

Check if additional changes were submitted and attach a document with the date of additional submissions.

Certification *This section is required.*

This form must be signed and notarized. Please complete this twice. Copies will not be accepted.

Certified By:

Carmelina Oliveira
Name (Print)

President
Title

Oliveira Contracting, Inc.
Name of Submitting Entity

Signature

2-19-14
Date

Notarized By:

Lucy Amador
Notary Public

Nassau
County License Issued

01RA6130289
License Number

Sworn to before me on: 2/19/14
Date

LUCY AMADOR
Notary Public - State of NY
No. 01RA6130289
Qualified in Nassau County
My Commission Expires 7/18/17

**BIDDER'S CERTIFICATION OF COMPLIANCE WITH
IRAN DIVESTMENT ACT**

Pursuant to General Municipal Law §103-g, which generally prohibits the City from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the bidder/proposer submits the following certification:

[Please Check One]

BIDDER'S CERTIFICATION

- By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer 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, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.
- I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: NASSAU, New York
Oct. 9, 2013



SIGNATURE

Carmelina Oliveira

PRINTED NAME

President

TITLE

Sworn to before me this
9th day of Oct, 2013



Notary Public

LUCY AMADOR
Notary Public - State of NY
No. 01RA6130289
Qualified in Nassau County
My Commission Expires 7/18/17

Dated: 10/9/13

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

Project Labor Agreement -- Letter of Assent

Dear:

The undersigned party confirms that it agrees to be a party to and be bound by the New York Agency, Project Labor Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Project Labor Agreement, its Schedules, Addenda and Exhibits are hereby incorporated by reference herein.

The undersigned, as a Contractor or Subcontractor (hereinafter Contractor) on the Project known as Salt Shed Construction and located at Spring St., Manhattan (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in the Project Labor Agreement, a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all schedules; amendments and supplements now existing or which are later made thereto;
- (2) Agrees to be bound by the legally established collective bargaining agreements and local trust agreements as set forth in the Project Labor Agreement and this Agreement but only to the extent of Program Work and as required by the PLA.
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor but only to the extent of Program Work as required by the PLA.
- (4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it has engaged or may engage to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee provisions.
- (5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a Subcontractor (of any tier), to it, a duly executed Agreement to be Bound in from identical to this document.

Dated: 10-18-13
NYCDDC
(Name of CM; GC; Contractor or Higher Level Subcontractor)

Oliveira Contracting, Inc.
(Name of Contractor or subcontractor)
[Signature]
(Authorized Officer & Title)

15 Albertson Ave., Albertson, NY 11507
(Address)

516-333-6343 516-333-6367
(Phone) (Fax)

Contractor's State License

LUCY AMADOR
Notary Public - State of NY
No. 01RA6130289
Qualified in Nassau County
My Commission Expires 7/18/17

Sworn to before me this 2013
18th day of October, 2009
Lucy Amador
Notary Public

The City of New York Department of Small Business Services
Division of Labor Services Contract Compliance Unit
110 William Street, New York, New York 10038
Phone: (212) 513 - 6323
Fax: (212) 618-8879

CONSTRUCTION EMPLOYMENT REPORT

GENERAL INFORMATION

1. Your contractual relationship in this contract is: Prime contractor Subcontractor
- 1a. Are MWBE goals attached to this project? Yes No
2. Please check one of the following if your firm would like information on how to certify with the City of New York as a:
 Minority Owned Business Enterprise Locally based Business Enterprise
 Women Owned Business Enterprise Emerging Business Enterprise
- 2a. If you are certified as an MBE, WBE or LBE, what city/state agency are you certified with?
NYCSBS, NYSCSA, NYSDDED _____ Are you DBE certified? Yes No
3. Please indicate if you would like assistance from SBS in identifying certified MWBEs for contracting opportunities: Yes No
4. Is this project subject to a project labor agreement? Yes No

PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

5. 56-2361008 _____
Employer Identification Number or Federal Tax I.D./ _____ Email Address
6. Oliveira Contracting, Inc. _____
Company Name
7. 15 Albertson Ave, Albertson, NY 11507 _____
Company Address and Zip Code
8. Carmelina Oliveira _____ 516-333-6343 _____
Chief Operating Officer Telephone Number
9. Joel Martins _____ 516-333-643 _____
Designated Equal Opportunity Compliance Officer Telephone Number
(If same as Item #7, write "same")
10. Same _____
Name of Prime Contractor and Contact Person
(If same as Item #5, write "same")
11. Number of employees in your company: 45 _____

12. Contract information:

- (a) NYCDDC
Contracting Agency (City Agency)
- (b) _____
Contract Amount
- (d) _____
Procurement Identification Number (PIN)
- (e) S195-227S
Contract Registration Number (CT#)
- (f) _____
Projected Commencement Date
- (g) _____
Projected Completion Date

(h) Description and location of proposed contract:
Spring Street Salt Shed Construction located at 553 Canal St., Manhattan

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

If yes, attach a copy of certificate.

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

If yes, attach a copy of certificate.

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

15. Has an Employment Report already been submitted for a different contract (not covered by this Employment Report) for which you have not yet received compliance certificate?
Yes ___ No X If yes,

Date submitted: _____
Agency to which submitted: _____
Name of Agency Person: _____
Contract No: _____
Telephone: _____

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

If yes,

(a) Name and address of OFCCP office.

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

If yes, attach a copy of such certificate.

(c) Were any corrective actions required or agreed to? Yes ___ No ___

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

(d) Were any deficiencies found? Yes ___ No ___

If yes, attach a copy of such findings.

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

If yes, attach a list of such associations and all applicable CBA's.
The Association of Wall-Ceiling & Carpentry Industries of NY
Association of Concrete Contractors of NY

PART II: DOCUMENTS REQUIRED

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

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

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

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

20. Explain where and how completed I-9 Forms, with their supportive documentation, are maintained and made accessible.
I-9 forms are kept on file at the company's office in the payroll department.

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

If yes, is the medical examination given:

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

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

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

If yes, list the document(s) and page number(s) where these written policies are located.
Company adopted from the Collective Bargaining Agreements.

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

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

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

If yes, please attach a copy of this policy.

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

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

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

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

If yes, attach a log. See instructions.

27. Are there any jobs for which there are physical qualifications? Yes ___ No X

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

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

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

SIGNATURE PAGE

I, (print name of authorized official signing) Carmelina Oliveira hereby certify that the information submitted herewith is true and complete to the best of my knowledge and belief and submitted with the understanding that compliance with New York City's equal employment requirements, as contained in Chapter 56 of the City Charter, Executive Order No. 50 (1980), as amended, and the implementing Rules and Regulations, is a contractual obligation.

I also agree on behalf of the company to submit a certified copy of payroll records to the Division of Labor Services on a monthly basis.

Oliveira Contracting, Inc.
Contractor's Name

Joel Martins Manager
Name of person who prepared this Employment Report Title

Carmelina Oliveira President
Name of official authorized to sign on behalf of the contractor Title

516-333-6343
Telephone Number

[Signature] 10-9-13
Signature of authorized official Date

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

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

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

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

Only original signatures accepted.

Sworn to before me this 9th day of October 2013

Lucy Amador [Signature] 10/9/13
Notary Public Authorized Signature Date

LUCY AMADOR
Notary Public - State of NY
No. 01RA6130289
Qualified in Nassau County
My Commission Expires 7/18/17

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

September 4, 2013

ADDENDUM No. # 1

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

S195-227S

Spring Street Salt Shed

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. Revised Pre-Bid Conference Date:

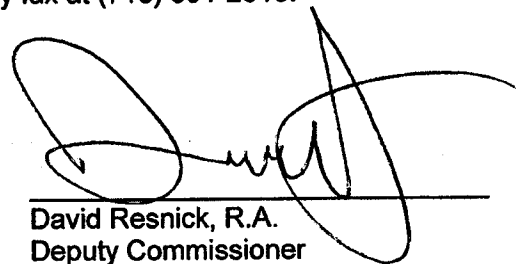
The Pre-Bid Conference/ Site Visit for the Contract described below scheduled for September 25th, 2013, at 10:00am at 553 Canal Street is rescheduled to September 17th, 2013, at 10:00am at 553 Canal Street.

Follow by a Pre-Bid Meeting at 1pm, September 17, 2013 at DDC Office, Conference Room 401, 30-30 Thomson Avenue, 4th Floor, Long Island City, New York 11101.

Contract 1 – General Construction Work.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.
Deputy Commissioner

Oliveira Contracting, Inc.

Name of Bidder

By: 

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

September 13, 2013

ADDENDUM No. # 2

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

S195-227S

Spring Street Salt Shed Construction

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. Questions from Bidders and Responses to Questions:

See Attachment A.

2. Revisions to the Specifications:

See Attachment B.

3. Revisions to the Bid Booklet:

Delete page 21-6 & 21-8 and replace with 21-6R & 21-8R, included with this Addendum.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.
Deputy Commissioner

Oliveira Contracting, Inc.
Name of Bidder

By: 

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

September 27, 2013

ADDENDUM No. # 3

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

S195-227S

Spring Street Salt Shed Construction

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. **Questions from Bidders and Responses to Questions:**
See Attachment A.
2. **Revisions to the Specifications:**
See Attachment B.
3. **Revisions to the Drawings:**
See Attachment C.
4. **Revisions to the Addendum to the General Conditions:**
See Attachment D.
5. **Revisions to the Bid Booklet:**
Delete page 6 and replace with 6R, included with this Addendum.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.
Deputy Commissioner

Oliveira Contracting, Inc.
Name of Bidder

By: 

NOTICE TO BIDDERS:

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

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

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

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

SPECIAL NOTICE TO BIDDERS

The New York City Department of Small Business Services (SBS), in conjunction with the New York Business Development Corporation (NYBDC), have established a NYC Construction Loan pilot program to provide prime contractors and subcontractors financing for mobilization costs on certain City construction projects.

Under this initiative, loans are available for early stage mobilization needs such as insurance, labor, supplies and equipment. Bidders are strongly encouraged to visit "Growing Your Business" at www.nyc.gov/nycbusiness to learn more about the loan or contact constructionloan@sbs.nyc.gov / (212) 513-6444 to obtain details and to determine preliminary eligibility.

A successful loan applicant will be required to make an assignment of its contract (or subcontract) payments to the lender NYBDC until the loan is repaid. If the loan is to a subcontractor, a prime contractor must honor the terms of such an assignment.

A prime contractor may not discriminate against a subcontractor or potential subcontractor by reason of the subcontractor's participation, or nonparticipation, in the NYC Construction Loan program.

**BID BOOKLET
PART A**

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PROJECT ID: S195-227S

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

BID BOOKLET

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

SPECIAL NOTICE TO BIDDERS

BID SUBMISSION REQUIREMENTS

THE BID SHALL CONSIST OF TWO (2) SEPARATE, SEALED ENVELOPES. THE DOCUMENTS THAT MUST BE COMPLETED AND INCLUDED IN EACH SEPARATE ENVELOPE ARE LISTED BELOW.

BID ENVELOPE #1: Bid Envelope #1 shall contain the following items:

- Bid Form, including Affirmation
- Bid Security (if required, see page 22)
- Schedule B: M/WBE Utilization Plan (if participation goals have been established)

BID ENVELOPE #2: Bid Envelope #2 shall contain **ONLY** the following item:

- Bidder's Identification of Subcontractors (see pages 16 & 17)

**FAILURE TO SUBMIT THE FOUR ITEMS LISTED ABOVE
WILL RESULT IN THE DISQUALIFICATION OF THE BID**

BID ENVELOPE #1: In addition to the items listed above, Bid Envelope #1 shall also contain the following items: **DO NOT** Include the items listed below in Bid Envelope #2.

- Bid Breakdown (if required, see page 21)
- Safety Questionnaire
- Construction Employment Report (if bid is \$1,000,000 or more)
- Contract Certificate (if bid is less than \$1,000,000)
- Confirmation of Vendex Compliance
- Bidder's Certification of Compliance with Iran Divestment Act
- Special Experience Requirements Qualification Form (if required, see pages 3, 4)
- Any Addenda issued prior to the receipt of bids

**FAILURE TO SUBMIT THE EIGHT ITEMS LISTED ABOVE
MAY RESULT IN THE DISQUALIFICATION OF THE BID.**

- NOTES:**
- (1) All of the above referred to blank forms to be completed and submitted with the bid are included in the BID BOOKLET.
 - (2) If the bidder has any questions or requires additional information, please contact the Department of Design and Construction by phone (718-391-2601) or by fax (718-391-2615).
 - (3) **VENDEX QUESTIONNAIRES:** Vendex Questionnaires, as well as detailed instructions, may be obtained at www.nyc.gov/vendex. The bidder may also obtain Vendex forms and instructions by contacting the Agency Chief Contracting Officer or the contact person for this contract.
 - (4) **SPECIAL EXPERIENCE REQUIREMENTS:** The Bidder is advised that Special Experience Requirements may apply to this contract. Such requirements are set forth on pages 3 and 4 of this Bid Booklet.
 - (5) **SPECIAL EXPERIENCE REQUIREMENTS FOR ASBESTOS:** The Bidder is advised that this contract contains strict requirements regarding the prior experience and licensing of the subcontractor who will perform any required asbestos abatement work. These special experience requirements are set forth in the section of the specifications which describes any required asbestos abatement work.

SPECIAL EXPERIENCE REQUIREMENTS

Special Experience Requirements apply as indicated below.

Bidder:	General Construction	<u> X </u>	YES	<u> </u>	NO
Specific Areas of Work:	General Construction	<u> X </u>	YES	<u> </u>	NO
	Plumbing Work	<u> </u>	YES	<u> X </u>	NO
	HVAC Work	<u> </u>	YES	<u> X </u>	NO
	Electrical Work	<u> </u>	YES	<u> X </u>	NO

- (A) **EXPERIENCE REQUIREMENTS FOR THE BIDDER:** The special experience requirements set forth below apply to the bidder 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 must complete the Qualification Form included in the Bid Booklet. 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) **JOINT VENTURES:** In the event the bidder is a joint venture, at least one firm in the joint venture must meet the above described experience requirements.
- (E) **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

- Section 02780: Unit Pavers
- Section 03300: Cast-in-Place Structural Concrete
- Section 03330: Architectural Cast-in-place Concrete
- Section 07124: EPDM Roofing

- (2) Special experience requirements applicable to the contractor or subcontractor that will perform specific areas of work are summarized below. Such experience requirements are set forth in full in the Addendum to the General Conditions.

The contractor or subcontractor performing the work of this section 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. In addition, for roofing work, the contractor or subcontractor must be licensed or approved by the manufacturer of the roofing system.

- (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 the Bid Booklet. 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.

Qualification Form

Project ID: S195-227S

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: _____

Name of Project: _____

Location of Project: _____

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

Name: _____

Title: _____ Phone Number: _____

Brief description of work completed: _____

Was the work performed as a prime or a subcontractor: _____

Amount of Contract: _____

Date of Completion: _____

Name of Contractor: _____

Name of Project: _____

Location of Project: _____

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

Name: _____

Title: _____ Phone Number: _____

Brief description of work completed: _____

Was the work performed as a prime or a subcontractor: _____

Amount of Contract: _____

Date of Completion: _____

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MWBE PROGRAM

M/WBE UTILIZATION PLAN

M/WBE Program Requirements: The requirements for the M/WBE Program are set forth on the following pages of this Bid Booklet, in the section entitled "Notice to All Prospective Contractors".

Schedule B: M/WBE Utilization Plan: Schedule B: M/WBE Utilization Plan for this Contract is set forth in this Bid Booklet on the pages following the section entitled "Notice to All Prospective Contractors". The M/WBE Utilization Plan (Part I) indicates whether Participation Goals have been established for this Contract. If Participation Goals have been established for this Contract, the bidder must submit an M/WBE Utilization Plan (Part II) with its bid.

Waiver: The bidder may seek a full or partial pre-award waiver of the Participation Goals in accordance with the "Notice to All Prospective Contractors" (See Part A, Section 10). The bidder's request for a waiver must be submitted at least seven (7) calendar days prior to the bid date. Waiver requests submitted after the deadline will not be considered. The form for requesting a waiver of the Participation Goals is set forth in the M/WBE Utilization Plan (Part III).

Rejection of the Bid: The bidder must complete Schedule B: M/WBE Utilization Plan (Part II) set forth in this Bid Booklet on the pages following the section entitled "Notice to All Prospective Contractors". A Schedule B submitted by the bidder which does not include the Vendor Certification and Required Affirmations (See Section V of Part II) will be deemed to be non-responsive, unless a full waiver of the Participation Goals is granted (Schedule B, Part III). In the event that the City determines that the bidder 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 Required Affirmations, the bidder 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 is non-responsive.

Receipt of notification is defined as the date notice is emailed or faxed (if the bidder has provided an email address or fax number), or no later than five (5) days from the date of mailing or upon delivery, if delivered.

Impact on LBE Requirements: If Participation Goals have been established for the participation of M/WBEs, the contractor is not required to comply with the Locally Based Enterprise Program ("LBE"). The LBE Program is set forth in Article 67 of the Contract.

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NOTICE TO ALL PROSPECTIVE CONTRACTORS

**PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS
ENTERPRISES IN CITY PROCUREMENT**

ARTICLE I. M/WBE PROGRAM

Local Law No. 129 of 2005 added and Local Law 1 of 2013 amended Section 6-129 of the Administrative Code of the City of New York (hereinafter "Section 6-129"). 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. 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 I to this Contract (see Page 1, line 1 Total Participation Goals) or will be set forth on Schedule B, Part I 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 New York City Department of Small Business Services 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 II (see Pages 2-4) 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; and (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. 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 II (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 II (see Pages 2-4) 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; and (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. 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 II). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS (SEE SECTION V OF PART II) WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART III). 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 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) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th 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 III (Page 5) 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 poped@ddc.nyc.gov or via facsimile at (718) 391-1886. Bidders, proposers, or contractors, as applicable, who have submitted 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 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.

13. 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.

14. 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 an **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 an **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;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 VENDEX as caution data.

Tax ID #: _____

APT E-
PIN#: 85014B0016

Contract # 1 - General Construction Work

SCHEDULE B - M/WBE Utilization Plan

Part I: M/WBE Participation Goals

Part I to be completed by contracting agency

Contract Overview

APT E-Pin # 85014B0016 FMS Project ID#: S195-227S
 Project Title/Agency Spring Street Salt Shed
 PIN # 8502014TR0001C
 Bid/Proposal
 Response Date: OCTOBER 9, 2013
 Contracting Agency Department of Design and Construction
 Agency Address 30-30 Thomson Avenue City Long Island City State NY Zip Code 11101
 Contact Person James A. Cerasoli Title Deputy Director
 Telephone # (718) 391-1549 Email CERASOLI@DDC.NYC.GOV

Project Description (attach additional pages if necessary)

This Project consists of the construction of a new fully enclosed, cast-in-place concrete salt shed; gated service yard; lot line concrete protection and push walls, two 5,000 gallon liquid calcium chloride tanks with associated dispensing equipment and concrete protection wall. This facility shall be constructed on a drilled caisson foundation. The floor slab, service yard and drive shall be a structural concrete slab supported by drilled caissons. The building will have exterior walls of cast-in-place concrete and a precast concrete roof deck supported by steel plate girders. Work includes related site work, mechanical, plumbing, electrical and other items noted on the Contract Documents.

M/WBE Participation Goals for Services

Enter the percentage amount for each group or for an unspecified goal.

Prime Contract Industry: Construction

Group	Percentage
<u>Unspecified</u>	<u>3 %</u>
or	
<u>Black American</u>	<u>UNSPECIFIED %</u>
<u>Hispanic American</u>	<u>UNSPECIFIED %</u>
<u>Asian American</u>	<u>UNSPECIFIED %</u>
<u>Women</u>	<u>UNSPECIFIED %</u>
Total Participation Goals	3 %

Line 1

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Tax ID #: _____

APT E-

PIN#: 85014B0016

SCHEDULE B - Part II: M/WBE Participation Plan

Form to be completed by the bidder/proposer:

Please note: For Non-M/WBE Prime Contractors who will NOT subcontract any services and will self-perform the entire contract, you must obtain a FULL waiver by completing the Waiver Application on pages 9 and 9a and timely submitting it to the contracting agency pursuant to the Notice to Prospective Contractors. Once a FULL WAIVER is granted, it must be included with your bid or proposal and you do not have to complete or submit this form with your bid or proposal.

Section I: Prime Contractor Contact Information	
Tax ID # _____	FMS Vendor ID # _____
Business Name _____	Contact Person _____
Address _____	
Telephone # _____	Email _____

Section II: M/WBE Utilization Goal Calculation: Check the applicable box and complete subsection.

PRIME CONTRACTOR ADOPTING AGENCY M/WBE PARTICIPATION GOALS					
<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Agency M/WBE Participation Goals. Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture. Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.	Total Bid/Proposal Value		Agency Total Participation Goals (Line 1, Page 6)		Calculated M/WBE Participation Amount
	\$	X		=	\$ Line 2

PRIME CONTRACTOR OBTAINED PARTIAL WAIVER APPROVAL: ADOPTING MODIFIED M/WBE PARTICIPATION GOALS					
<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Modified M/WBE Participation Goals. Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture. Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.	Total Bid/Proposal Value		Adjusted Participation Goal (From Partial Waiver)		Calculated M/WBE Participation Amount
	\$	X		=	\$ Line 3

Section III: M/WBE Utilization Plan: How Proposer/Bidder Will Fulfill M/WBE Participation Goals. Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation. Check applicable box. The Proposer or Bidder will fulfill the M/WBE Participation Goals:

As an M/WBE Prime Contractor that will self-perform and/or subcontract to other M/WBE firms a portion of the contract the value of which is at least the amount located on Lines 2 or 3 above, as applicable. The value of any work subcontracted to non-M/WBE firms will not be credited towards fulfillment of M/WBE Participation Goals. Please check all that apply to Prime Contractor:

MBE WBE

As a Qualified Joint Venture with an M/WBE partner, in which the value of the M/WBE partner's participation and/or the value of any work subcontracted to other M/WBE firms is at least the amount located on Lines 2 or 3 above, as applicable. The value of any work subcontracted to non M/WBE firms will not be credited towards fulfillment of M/WBE Participation Goals.

As a non M/WBE Prime Contractor that will enter into subcontracts with M/WBE firms the value of which is at least the amount located on Lines 2 or 3 above, as applicable.

Section IV: General Contract Information

What is the expected percentage of the total contract dollar value that you expect to award in subcontracts for services, regardless of M/WBE status? % _____

Enter brief description of the type(s) and dollar value of subcontracts for all any services you plan on subcontracting if awarded this contract. For each item, indicate whether the work is designated for participation by MBEs and/or WBEs and the time frame in which such work is scheduled to begin and end. Use additional sheets if necessary.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____
- 8. _____
- 9. _____
- 10. _____
- 11. _____
- 12. _____
- 13. _____
- 14. _____
- 15. _____
- 16. _____
- 17. _____

✓ **Scopes of Subcontract Work**

Section V: Vendor Certification and Required Affirmations

I hereby:

- 1) acknowledge my understanding of the M/WBE participation requirements as set forth herein and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York (Section 6-129), and the rules promulgated thereunder;
- 2) affirm that the information supplied in support of this 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
- 5) 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.

Signature _____

Date _____

Print Name _____

Title _____

SCHEDULE B – PART III – REQUEST FOR WAIVER OF M/WBE PARTICIPATION REQUIREMENT

Contract Overview

Tax ID # _____ FMS Vendor ID # _____
 Business Name _____
 Contact Name _____ Telephone # _____ Email _____
 Type of Procurement Competitive Sealed Bids Other Bid/Response Due Date _____
 APT E-PIN # (for this procurement): _____ Contracting Agency: _____

M/WBE Participation Goals as described in bid/solicitation documents

_____ % Agency M/WBE Participation Goal

Proposed M/WBE Participation Goal as anticipated by vendor seeking waiver

_____ % of the total contract value anticipated in good faith by the bidder/proposer to be subcontracted for services and/or credited to an M/WBE Prime Contractor or Qualified Joint Venture.

Basis for Waiver Request: Check appropriate box & explain in detail below (attach additional pages if needed)

- Vendor does not subcontract services, and has the capacity and good faith intention to perform all such work itself with its own employees.
- Vendor subcontracts some of this type of work but at a lower % than bid/solicitation describes, and has the capacity and good faith intention to do so on this contract. (Attach subcontracting plan outlining services that the vendor will self-perform and subcontract to other vendors or consultants.)
- Vendor has other legitimate business reasons for proposing the M/WBE Participation Goal above. Explain under separate cover.

References

List 3 most recent contracts performed for NYC agencies (if any). Include information for each subcontract awarded in performance of such contracts. Add more pages if necessary.

CONTRACT NO. _____	AGENCY _____	DATE COMPLETED _____
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____
CONTRACT NO. _____	AGENCY _____	DATE COMPLETED _____
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____
CONTRACT NO. _____	AGENCY _____	DATE COMPLETED _____
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____

List 3 most recent contracts performed for other entities. Include information for each subcontract awarded in performance of such contracts. Add more pages if necessary.
 (Complete ONLY if vendor has performed fewer than 3 New York City contracts.)

TYPE OF Contract _____	ENTITY _____	DATE COMPLETED _____
Manager at entity that hired vendor (Name/Phone No./Email) _____		
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Type of Work Subcontracted _____	_____	_____

TYPE OF Contract _____	AGENCY/ENTITY _____	DATE COMPLETED _____
Manager at agency/entity that hired vendor (Name/Phone No./Email) _____		
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____

TYPE OF Contract _____	AGENCY/ENTITY _____	DATE COMPLETED _____
Manager at entity that hired vendor (Name/Phone No./Email) _____		
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____

VENDOR CERTIFICATION: *I hereby affirm that the information supplied in support of this waiver request is true and correct, and that this request is made in good faith.*

Signature: _____ **Date:** _____
Print Name: _____ **Title:** _____

Shaded area below is for agency completion only

Agency Name: _____
 Agency Address: _____
 Agency Phone: _____
 Agency Email: _____

Waiver Determination:
 Full Waiver Approved
 Waiver Denied
 Partial Waiver Approved
 Revised Participation Goal

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

**BID FOR FURNISHING ALL LABOR AND
MATERIAL NECESSARY AND REQUIRED FOR:**

PROJECT ID: S195-227S

**Spring Street Salt Shed Construction
553 Canal Street
Manhattan 10013**

Name of Bidder: _____

Date of Bid Opening: _____

Bidder is: (Check one, whichever applies) Individual () Partnership () Corporation ()

Place of Business of Bidder: _____

Bidder's Telephone Number: _____ Bidder's Fax Number: _____

Bidder's Email Address: _____

Residence of Bidder (If Individual): _____

If Bidder is a Partnership, fill in the following blanks:

Names of Partners

Residence of Partners

If Bidder is a Corporation, fill in the following blanks:

Organized under the laws of the State of _____

Name and Home Address of President: _____

Name and Home Address of Secretary: _____

Name and Home Address of Treasurer: _____

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BID FORM

The above-named 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 set forth on the Affirmation included as page 17 of this Bid Booklet.

The bidder hereby affirms that it has paid all applicable City income, excise and other taxes for all years it has conducted business activities in New York City.

5. 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).

6. 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.

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.

7. 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.

8. 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.

9. 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:

10. **M/WBE UTILIZATION PLAN:** By signing its bid, the bidder agrees to the Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted. The Vendor Certification and Required Affirmations will be deemed to satisfy the requirement to complete Section V of Part II of Schedule B: M/WBE Utilization Plan.

Alternate Bids

Bidder is advised that the City is requesting the submission of two (2) alternate bids for **Contract #1 – General Construction Work** (Bid Alternate #1 and Bid Alternate #2). Each of these Bid Alternates addresses a different specific Scope of Work, as described below. Bid prices for these two (2) different Scopes of Work for General Construction Work shall be submitted on BID FORM - Bid Alternate 1, and BID FORM - Bid Alternate 2, in this Bid Booklet.

BID ALTERNATE #1: Requires a Total Lump Sum Price for all labor and material necessary to perform all required work described in the Contract Documents, **excluding** the scope of work for Bid Alternate #2, as described below. Bid Alternate #1 is the Project Base Bid.

BID ALTERNATE #2: Requires a Total Lump Sum Price for the following: (1) all required work for Bid Alternate #1 (Project Base Bid), **plus** (2) all required work for the scope of Alternate #2 work. The scope of work for Alternate #2 is to provide stainless steel reinforcement for all cast-in-place concrete structures and elements, as described in the following Contract Documents: Drawings S-001.00 and S-006.00, and Specification Section 03200.

Bidders are requested to submit prices on the Bid Forms for alternate Bids described above. Following the receipt of Bids, the Department of Design and Construction will determine, in the best interest of the City, whether to award a contract based upon the Total Bid Price for **Bid Alternate #1, or Bid Alternate #2.**

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BID FORM ALTERNATE 1

PROJECT ID: S195-227S

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

- A. **LUMP SUM PRICE** - Total price for all labor and material for all required work set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price for
Material Sold and
Delivered

Total Price For
Labor

\$ _____ + \$ _____ Total Price for Item A= \$ _____

BIDDER'S SIGNATURE AND AFFIDAVIT

- * **SUBCONTRACTOR IDENTIFICATION:** You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". _____ Yes _____ No

- * **M/WBE UTILIZATION PLAN:** By signing its bid in the space below, the bidder agrees to the Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted. The Vendor Certification and Required Affirmations will be deemed to satisfy the requirement to complete Section V of Part II of Schedule B: M/WBE Utilization Plan.

Section V: Vendor Certification and Required Affirmations: 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 5) 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.

Bidder: _____

By: _____
(Signature of Partner or corporate officer)

Attest: _____
(Corporate Seal) Secretary of Corporate Bidder

Affidavit on the following page should be subscribed and sworn to before a Notary Public

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BID FORM ALTERNATE 2

PROJECT ID: S195-227S

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

- A. **LUMP SUM PRICE** - Total price for all labor and material for all required work set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price for
Material Sold and
Delivered

Total Price For
Labor

\$ _____ + \$ _____ Total Price for Item A= \$ _____

BIDDER'S SIGNATURE AND AFFIDAVIT

- * **SUBCONTRACTOR IDENTIFICATION:** You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". _____ Yes _____ No
- * **M/WBE UTILIZATION PLAN:** By signing its bid in the space below, the bidder agrees to the Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted. The Vendor Certification and Required Affirmations will be deemed to satisfy the requirement to complete Section V of Part II of Schedule B: M/WBE Utilization Plan.

Section V: Vendor Certification and Required Affirmations: 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 5) 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.

Bidder: _____

By: _____
(Signature of Partner or corporate officer)

Attest: _____ Secretary of Corporate Bidder
(Corporate Seal)

Affidavit on the following page should be subscribed and sworn to before a Notary Public

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BID FORM (TO BE NOTARIZED)

AFFIDAVIT WHERE BIDDERS IS AN INDIVIDUAL

STATE OF NEW YORK, COUNTY OF _____ ss:

_____ being duly sworn says:

I am the person described in and who executed the foregoing bid, and the several matters therein stated are in all respects true.

(Signature of the person who signed the Bid)

Subscribed and sworn to before me this
_____ day of _____,

Notary Public

AFFIDAVIT WHERE BIDDERS IS A PARTNERSHIP

STATE OF NEW YORK, COUNTY OF _____ ss:

_____ being duly sworn says:

I am a member of _____ the firm described in and which executed the foregoing bid.
subscribed the name of the firm thereto on behalf of the firm, and the several matters therein stated are in all respects true.

(Signature of Partner who signed the Bid)

Subscribed and sworn to before me this
_____ day of _____,

Notary Public

AFFIDAVIT WHERE BIDDERS IS A CORPORATION

STATE OF NEW YORK, COUNTY OF _____ ss:

_____ being duly sworn says:

I am the _____ of the above named corporation whose name is subscribed to and which executed
the foregoing bid. I reside at _____.

I have knowledge of the several matters therein stated, and they are in all respects true.

(Signature of Corporate Officer who signed the Bid)

Subscribed and sworn to before me this
_____ day of _____,

Notary Public

AFFIRMATION

The undersigned bidder affirms and declares that said bidder is not in arrears to the City of New York upon debt, contract or taxes and is not a defaulter, as surety or otherwise, upon obligation to the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York, nor is there any proceeding pending relating to the responsibility or qualification of the bidder to receive public contracts except _____

(If none, the bidder shall insert the word "None" in the space provided above.)

Full Name of Bidder: _____

Address: _____

City: _____ State: _____ Zip Code: _____

CHECK ONE BOX AND INCLUDE APPROPRIATE NUMBER:

A - Individual or Sole Proprietorship *
SOCIAL SECURITY NUMBER

B - Partnership, Joint Venture or other unincorporated organization
EMPLOYER IDENTIFICATION NUMBER

C - Corporation
EMPLOYER IDENTIFICATION NUMBER

By: _____
Signature:

Title: _____

If a corporation, place seal here

This affirmation must be signed by an officer or duly authorized representative.

* Under the Federal Privacy Act the furnishing of Social Security Numbers by bidders on City contracts is voluntary. Failure to provide a Social Security Number will not result in a bidder's disqualification. Social Security Numbers will be used to identify bidders, proposers or vendors to ensure their compliance with laws, to assist the City in enforcement of laws, as well as to provide the City a means of identifying of businesses which seek City contracts.

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

BID ALTERNATE 1

NOTICE TO BIDDERS

SUBMISSION: The Bidder must, at the time of the bid, submit the form on the next page ("BIDDER'S IDENTIFICATION OF SUBCONTRACTORS"). This form must be submitted in a separate, sealed envelope (BID ENVELOPE #2). Failure to do so will result in the disqualification of the bid as non-responsive.

Please be advised that pursuant to GML § 101(5) the Bidder is required to submit with its bid the names of subcontractors it intends to use to perform the following work on this contract, as well as the agreed-upon amount to be paid to each:

- plumbing and gas fitting;
- steam heating, hot water heating, ventilating and air conditioning apparatus; and
- electric wiring and standard illuminating fixtures.

NOTE: This project may not involve all of the above listed subcontractors. Please see the form on the next page which indicates the subcontractors required for this Project.

The list of subcontractors is to be submitted in a separate sealed envelope by completing the form on the next page entitled "Bidder's Identification of Subcontractors". This form provides for the identification of any subcontractors intended to be used in any of the three trades listed above. If bidder intends to use its own forces for any of the above listed work, bidder should so indicate on the form.

Failure to submit the completed form on the next page ("Bidder's Identification of Subcontractors") that includes the names of subcontractors and the agreed upon amounts to be paid to such subcontractors will render the bid non-responsive.

PLEASE NOTE: for any contract that is subject to M/WBE Participation Goals under Section 6-129 of the Administrative Code of the City of New York, if the bidder's intention to use its own forces to do any of the above-referenced work would result in Bidder's failure to attain the Participation Goals identified in the M/WBE Utilization Plan, the bid will be non-responsive unless the bidder requests and obtains a full or partial waiver of the Participation Goals (M/WBE Utilization Plan, Part III) in advance of bid submission. For more information see Notice to All Prospective Contractors, Participation by Minority-Owned and Women-Owned Business Enterprises in City Procurement.

After the low bid is announced, the sealed list submitted by the low bidder will be opened and the names of the subcontractors will be announced. The sealed lists of subcontractors submitted by all other bidders shall be maintained by the Agency unopened unless such bidder shall become the low bidder (e.g., the initial low bidder is found non-responsive). All unopened lists of subcontractors shall be returned to the bidders unopened after contract award, unless the bidder has given the agency permission to shred the form.

After bid submission, any change of subcontractor or agreed-upon amount to be paid to each shall require approval of the Agency upon a showing of a legitimate construction need which shall include, but not be limited to, a change in project specifications, a change in project material costs, a change to subcontractor status as determined pursuant to §222 (2)(e) of the Labor Law, or if the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

BID ALTERNATE 1

Project ID: S195-227S

SUBMISSION: In addition to its Bid (Bid Envelope # 1), the Bidder must, at the time of the bid, complete and submit this form in a separate, sealed envelope (Bid Envelope # 2). To complete this form, the Bidder must identify the subcontractors it intends to use for the work listed below, as well as the dollar amount to be paid to each subcontractor. Failure to complete this form and submit it in a separate, sealed envelope will result in the disqualification of the bid as non-responsive.

The Bidder intends to use the following subcontractors. If the Bidder intends to do any of the work referenced below with its own forces, the Bidder should complete this form using its own name. If multiple subcontractors for any trade are proposed, Bidder may submit multiple copies of this form.

1. PLUMBING CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

2. HVAC CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

3. ELECTRICAL CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

BIDDER'S SIGNATURE: The Bidder must sign this form in the space provided below:

Name of Bidder: _____

By: _____
Signature of Partner or Corporate Officer

Print Name: _____

Title: _____

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

BID ALTERNATE 2

NOTICE TO BIDDERS

SUBMISSION: The Bidder must, at the time of the bid, submit the form on the next page ("BIDDER'S IDENTIFICATION OF SUBCONTRACTORS"). This form must be submitted in a separate, sealed envelope (BID ENVELOPE #2). Failure to do so will result in the disqualification of the bid as non-responsive.

Please be advised that pursuant to GML § 101(5) the Bidder is required to submit with its bid the names of subcontractors it intends to use to perform the following work on this contract, as well as the agreed-upon amount to be paid to each:

- plumbing and gas fitting;
- steam heating, hot water heating, ventilating and air conditioning apparatus; and
- electric wiring and standard illuminating fixtures.

NOTE: This project may not involve all of the above listed subcontractors. Please see the form on the next page which indicates the subcontractors required for this Project.

The list of subcontractors is to be submitted in a separate sealed envelope by completing the form on the next page entitled "Bidder's Identification of Subcontractors". This form provides for the identification of any subcontractors intended to be used in any of the three trades listed above. If bidder intends to use its own forces for any of the above listed work, bidder should so indicate on the form.

Failure to submit the completed form on the next page ("Bidder's Identification of Subcontractors") that includes the names of subcontractors and the agreed upon amounts to be paid to such subcontractors will render the bid non-responsive.

PLEASE NOTE: for any contract that is subject to M/WBE Participation Goals under Section 6-129 of the Administrative Code of the City of New York, if the bidder's intention to use its own forces to do any of the above-referenced work would result in Bidder's failure to attain the Participation Goals identified in the M/WBE Utilization Plan, the bid will be non-responsive unless the bidder requests and obtains a full or partial waiver of the Participation Goals (M/WBE Utilization Plan, Part III) in advance of bid submission. For more information see Notice to All Prospective Contractors, Participation by Minority-Owned and Women-Owned Business Enterprises in City Procurement.

After the low bid is announced, the sealed list submitted by the low bidder will be opened and the names of the subcontractors will be announced. The sealed lists of subcontractors submitted by all other bidders shall be maintained by the Agency unopened unless such bidder shall become the low bidder (e.g., the initial low bidder is found non-responsive). All unopened lists of subcontractors shall be returned to the bidders unopened after contract award, unless the bidder has given the agency permission to shred the form.

After bid submission, any change of subcontractor or agreed-upon amount to be paid to each shall require approval of the Agency upon a showing of a legitimate construction need which shall include, but not be limited to, a change in project specifications, a change in project material costs, a change to subcontractor status as determined pursuant to §222 (2)(e) of the Labor Law, or if the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

BID ALTERNATE 2

Project ID: S195-227S

SUBMISSION: In addition to its Bid (Bid Envelope # 1), the Bidder must, at the time of the bid, complete and submit this form in a separate, sealed envelope (Bid Envelope # 2). To complete this form, the Bidder must identify the subcontractors it intends to use for the work listed below, as well as the dollar amount to be paid to each subcontractor. Failure to complete this form and submit it in a separate, sealed envelope will result in the disqualification of the bid as non-responsive.

The Bidder intends to use the following subcontractors. If the Bidder intends to do any of the work referenced below with its own forces, the Bidder should complete this form using its own name. If multiple subcontractors for any trade are proposed, Bidder may submit multiple copies of this form.

1. PLUMBING CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

2. HVAC CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

3. ELECTRICAL CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

BIDDER'S SIGNATURE: The Bidder must sign this form in the space provided below:

Name of Bidder: _____

By: _____
Signature of Partner or Corporate Officer

Print Name: _____

Title: _____

BID BOND 1
FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, _____

hereinafter referred to as the "Principal", and _____

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 _____

(\$ _____), 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 _____

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.

BID BOND 2

In the event that the Proposal of the Principal shall be accepted and the Contract be awarded to him 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 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 _____ day of _____, _____.

(Seal)

Principal (L.S.)

By: _____

(Seal)

Surety

By: _____

BID BOND 3

ACKNOWLEDGEMENT OF PRINCIPAL, IF A CORPORATION

State of _____ County of _____ ss:
On this _____ day of _____, _____, before me personally came _____ to me known, who, being by me duly sworn, did depose and say that he resides at _____ that he is the _____ 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

ACKNOWLEDGEMENT 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

ACKNOWLEDGEMENT 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

AFFIX ACKNOWLEDGEMENTS AND JUSTIFICATION OF SURETIES

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BID BREAKDOWN

Submission: Bidders are advised that the requirement to submit a Bid Breakdown applies to each contract for which an "X" is indicated before the word "Yes". If required, the bidder must submit, with its bid, a completed Bid Breakdown. Failure to provide a completed Bid Breakdown may result in rejection of the bid as non-responsive.

 X YES NO

Limitations on Use of Bid Breakdown:

Bidders are advised that the Bid Breakdown shall be used for bid analysis purposes only and shall not be binding for any other purposes under the Contract, including, without limitation, for payment purposes or in connection with a contractor claim for extra work. If the form for the Bid Breakdown does not include an item of work required by the Contract Documents, such omission shall have no effect whatsoever, nor shall it be used by the contractor in connection with a claim for extra work (i.e., work for which the contractor is entitled to a change order).

Instructions for Preparing Bid Breakdown:

- (A) The Bid Breakdown is set forth on the following pages of this Bid Booklet and is in accordance with the Construction Specification Institute (CSI) format. For all items of work listed in the Bid Breakdown, the bidder must indicate the price for labor and the price for material, as well as the estimated quantities required.
- (B) In preparing its Bid Breakdown, the bidder shall submit prices that include all costs for overhead and profit. Overhead shall include, without limitation, all costs in connection with the following: administration, management, superintendence, small tools, insurance, bonds, and provision of services or items required by the General Conditions [except for Security/Fire Guard Services and Temporary Heat]. If the Project requires Security/Fire Guard Services and/or Temporary Heat, such service(s) will be included as separate line items in the Bid Breakdown.
- (C) If an item is set forth in the Bid Breakdown, but is not included in the Contract Documents (Drawings, Specifications, General Conditions, and/or Addenda), the bidder is advised to leave the item blank and exclude the cost of the item from its grand total. In an attachment to its Bid Breakdown, the bidder shall provide a list of all items left blank.
- (D) If an item is not set forth in the Bid Breakdown, but is included in the Contract Documents (Drawings, Specifications, General Conditions, and/or Addenda), the bidder is advised to add the item to its Bid Breakdown and include the cost of the item in its grand total. In an attachment to its Bid Breakdown, the bidder shall provide a list of all items added.

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - General Construction

Project: Spring Street Salt Shed

Location: 553 Canal Street, New York NY 10013

Bidder:

DDC ID: S195-227S

Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	CONTRACT 1 - GENERAL CONSTRUCTION WORK							
Division 1	GENERAL REQUIREMENTS							
01000	Mobilization		LS					
	Debris Protection Nets		LS					
	Public Protection							
	Sidewalk Bridge /Fence		LF					
	Misc Protection		LS					
	Maintain Site Fence		LS					
	Code Signage		GSF					
	Miscellaneous Specialities		GSF					
	Trailer Hook-Ups		EA					
	Temporary Water for Construction		LS					
	Temporary Toilets		LS					
	Security Guard/ Fire Guard		MH					
	Subtotal							
Division 2	EXISTING CONDITIONS							
02200	Earthwork							
	Mass Soil Excavation for Mat Slab		CY					
	Excavate for Pits		LS					
	Carting		CY					
	Local Dewatering including Line & Grade, Master Mech		LS					
	Subtotal							
02260	Excavation Support and Protection (Included w/ 02200)							
02470	Drilled Caisson Piles							
	Sheeting/ Piling Work		SF					
	300 ton							
	12" Diameter, 3/8" thick casing (100 LF Allowance)		VLF					

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	12' Caisson Embed in Bedrock per F-0100		VLF					
	6000 psi Concrete Fill		CY					
	Steel Reinforcement #18 Grade 75 Thread Bar - (1 EA, 100 LF)		LBS					
	200 ton							
	12" Diameter, 3/8" thick casing (100 LF Allowance)		VLF					
	9' Caisson Embed in Bedrock		VLF					
	6000 psi Concrete Fill		CY					
	Steel Reinforcement# 14 Grade 75 Thread Bar - (1 EA, 100 LF)		LBS					
	Video inspection of rock sockets		LS					
	Lateral load test		EA					
	Tension load test		EA					
	Misc Pits		EA					
	Subtotal							
02503	Installation of Buried Pipelines (Included w/ 02504)							
02504	Sanitary and Storm Sewer Structures							
	Site Utilities Street connection Storm water		LS					
	Trench Drains							
	12" Trench Drain at gates Concrete/SS Channel		LF					
	Trench drain Grating inside roll up door and sitework 12" wide		LF					
	6" Trench Drain - Concrete channel		LF					
	Storm Stainless Steel Grating trench drain at sidewalk 6" wide		LF					
	Storm Drainage							
	8" Diameter Drain Pipe from Tank		LF					
	12" pipe for storm water piping connect to the street		LF					
	6" Pipe for Trench to Manhole Connections		LF					
	Manholes 2ea		LS					
	ConEd Vaults/Conduits							
	2" Electrical Conduit		LF					
	Subtotal							

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CONTRACT 1 - General Construction

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DDC ID: S195-227S

Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
02505	Leakage Tests (Included w/ 02504)							
02745	Cast Laminated Glass Pavers Distinctive (Laminated Textured Glass Panel) Paving at lighting fixtures Add Distinctive (Laminated Textured Glass Panel) Paving at lighting fixtures		SF SF					
	Subtotal							
02762	Traffic Paint Pavement Markings (Included w/ 02771)							
02771	Concrete Curbs, Headers, and Sidewalks Site Slab on Grade -36" thick, 6000 psi Reinforcement Epoxy Coated - #9@12 EW T. & B. Formwork Pourus Fill - 12" Remove Existing Sidewalks Saw cut Concrete Road Base Full Depth @ Curb Remove Existing Steel Faced Curb Curbs (Steel Faced Concrete) New Sidewalk Access Driveways Miscellaneous protection Street 5' restoration Site Retaining Walls Excavation and Back fill (Included w/ (02200) Wall @ Adjacent Holland Tunnel Ventilation Building (10' x 12" x 140 LF)		CY TONS SF CY SF LF LF LF SF SF LS SF					
	CIP Concrete Formwork Steel Reinforcement Pre-cast coping		CY SFCA TONS LF					
	Subtotal							

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Spring Street Salt Shed

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Bidder:

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - General Construction

DDC ID: S195-227S

Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
02780	Unit Pavers							
	Landscaping							
	New Street Trees Gleiditsia Triacanthos 3"-3 1/2" cal.		EA					
	Belgian block pavers around trees		EA					
	Wicket Fence around the trees		EA					
	Plants / Top soil / Maintenance 3 month per L-201		LS					
	Subtotal							
02826	Decorative Metal Fences and Gates							
	Gates		EA					
	Mobilize		LS					
	Custom Painted Steel Fence to match gate - 8' tall		LF					
	Aluminum gates per A-404		EA					
	Subtotal							
02930	Exterior Plants (Included w/ 02780)							
Division 3	CONCRETE							
03100	Concrete Forms and Accessories (Included w/ 03300)							
03200	Concrete Reinforcement (Included w/ 03300)							
03300	Cast-In-Place Structural Concrete							
	Mat Slab - 42" Thick, 6000 psi		CY					
	Reinforcement							
	#10 @ 12 E.W. Top Bars		TONS					
	#9 @ 12 Bottom Bars		TONS					
	Additional #10 @ 6" along walls		TONS					
	Formwork		SF					
	Pourus Fill - 12"		CY					

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NEW YORK CITY DEPARTMENT OF
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CONTRACTOR'S BID BREAKDOWN FORM

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Project: Spring Street Salt Shed
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Bidder:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Grade Beam/Haunch							
	CIP Concrete, 6000 psi		CY					
	Reinforcement							
	#5 Epoxy Covered Stirrups @ 12"		TONS					
	#8 Epoxy Covered Horizontal Bars		TONS					
	Formwork perimeter 3'x4' additional to the mat slab		SF					
	Cast-in-place Concrete Walls							
	CIP Concrete (6000 psi)		CY					
	Formwork with support for Architecture finished		SF					
	Formwork inside of the building		SF					
	Architectural Finish lining on Façade Exterior Wall		SF					
	Reinforcement epoxy coated		TONS					
	Anchors/dowels for embeds in footing		LS					
	CIP concrete at roof level 12"x 24" S-116		CY					
	Winter Weather		LS					
	Housekeeping/Mech Pads		LS					
	Built-ins / Embeds		LS					
	Crane/man lift		LS					
	Subtotal							
03330	Architectural Cast-in-Place Concrete (Included w/ 03300)							
03350	Concrete Finishes							
	Grouting							
	Welded Wire Mesh - 6x6 - W4.0xW4.0 W.W.F. @ Roof Level		SF					
	2" Thick Grout Topping for Precast Concrete Panels @ Roof Level		SF					
	3" MIN (9" MAX) High Strength Grout Topping @ Ground Level		SF					
	SS Wire Mesh @ Ground Level		SF					
	Subtotal							

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03411	Precast Concrete Hollow Core Planks							
	Scaffolding		SF					
	Precast Concrete Panels 6" thick supply only		SF					
	Install and support pre-cast plank		EA					
	Subtotal							
Division 4	MASONRY							
04400	Masonry/ Stone							
	Granite stone 1" thick at sitewalk level at exterior wall		SF					
	Subtotal							
Division 5	METALS							
05120	Structural Steel							
	Roof Plate Girders (PG1 - PG5, W18)		TON					
	Connections (10%)		TON					
	Subtotal							
05500	Metal Fabrications							
	Pre-cast panel support (tube/anchors/welding)		TON					
	Misc Framing at Openings		LS					
	Stain Steel roof cable rails		LF					
	Catwalk at roof level		SF					
	12" Bollard - Concrete filled steel pipe		EA					
	Subtotal							
05510	Exterior Metal Stairs (Included w/ 05500)							
05532	Stainless Steel Floor Grating and Plate							
	Stainless Steel Enclosure for the electrical panel (A-304/A-403)		LS					
	Stainless Steel Canopy @ Electrical Panels (2 loc)		SF					
	Add 1" Thick, 8' High Corten Plates @ Interior Perimeter (Supply \$1.5per/lbs)		SF					
	Subtotal							

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
05730	Decorative Metal Railings (Included w/ 05500)							
Division 6	WOOD AND PLASTICS							
06100	Rough Carpentry		GSF					
	Rough Carpentry							
	Subtotal							
Division 7	THERMAL AND MOISTURE PROTECTION							
07124	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing		SF					
	EPDM Membrane roofing on 2 layers of recovery boards		SF					
	2" Thick Rubber Pavers		LF					
	Wall expansion cover joint and plate pea A-402/11 at existing building and retaining wall							
	Subtotal							
07130	Foundation Waterproofing							
	Bituminous Sheet - 56-mil rubberized asphalt laminate, 4-mil PE film		SF					
	Subtotal							
07620	Sheetmetal Flashing and Trim							
	Aluminum Metal flashing		LF					
	Subtotal							
07720	Roof Accessories (Included w/ 07124)							
07920	Joint Sealants (Included w/ 03330)							
07921	Concrete Paving Joint Sealants (Included w/ 02745)							

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
Division 8	DOORS AND WINDOWS							
08331	Overhead Coiling Doors							
	SS frame type 316 around opening for the door		LF					
	Roll Up Door Stainless Steel 31'x21' (McKeon Door)		SF					
	Add for increase the size of the door to 24' wide		SF					
	Subtotal							
08391	Flood Barriers							
	Flood Gate (A-601)		LS					
	Subtotal							
08620	Unit Skylights							
	Unit Skylight - Typical		EA					
	Subtotal							
Division 9	FINISHES							
09960	High Performance Coating							
	Painting of exposed structural steel		SF					
	Scaffolding/scissor lift		LS					
	Subtotal							
Division 13	SPECIAL CONSTRUCTION							
13210	Underground Storage Tanks							
	Rainwater Collection Tank							
	Excavation		CY					
	Carting		CY					
	Concrete Foundation Mat - 3'6" Thick		CY					
	Concrete Walls - 1' 6" Thick		CY					
	Formwork		SF					
	Reinforcement		TONS					

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NEW YORK CITY DEPARTMENT OF
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 Sponsor Agency: Dept of Sanitation

Project: Spring Street Salt Shed
 Location: 553 Canal Street, New York NY 10013
 Bidder:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Storm Water Retention Tank Allowance (6,000 Gallons)		LS					
	CaCl Tank Wall/ Enclosure one side		CY					
	CIP Concrete		SFCA					
	Formwork		TONS					
	Steel Reinforcement							
	Subtotal							
Division 15	MECHANICAL							
15050	Basic Mechanical Materials and Methods							
	Temporary Heat		LS					
	Rigging, Hoisting & Lifts		LS					
	Testing & Inspections		LS					
	System Identification		LS					
	Sleeves & Fire Stopping		LS					
	Equipment Startup		LS					
	Misc. Control Wiring for Tanks		LS					
	Subtotal							
15051	Ductile Iron Pipe (Included w/ 15160)							
15060	Hangers and Supports (Included w/ 15160)							
15081	Piping Insulation (Included w/ 15160)							
15120	Interior and Exposed Piping Schedule (Included w/ 15180)							
15160	Storm Drainage Piping and Vents							
	Roof Drains		EA					
	Overflow Drains		EA					
	Storm Drainage Piping		LF					
	Add Storm Drainage Piping		LF					
	Insulation for Horizontal Pipe		LF					

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Overflow Drainage Riser		LF					
	Vent Piping		LF					
	Misc. Accessories & Specialties		LS					
	Sump Pump storm water		LS					
	Piping for the above pumps		LS					
	Subtotal							
15430	Plumbing Specialties							
	Misc. Valves & Specialties		LS					
	Subtotal							
15810	Ductwork							
	Ventilation System							
	Stainless Steel Ductwork for 5 Fans and air Intake		LBS					
	Duct Insulation (250 sf)		LS					
	Motorized Dampers		SF					
	Backdraft Dampers		SF					
	Grilles, Registers, & Diffusers - Stainless Steel		EA					
	OAI Penthouse Louver		LS					
	Exhaust/OAI Louvers (assume Galvanized)		SF					
	Subtotal							
15820	Ductwork Accessories							
	Miscellaneous S.S. Sheetmetal Supports & Accessories		LS					
	Subtotal							
15830	Fans							
	Salt Storage Shed Exhaust Fans EAF-2 to EAF-4 (4 @ 3,800 cfm ea)		EA					
	Salt Storage Shed Exhaust Fan EAF-5 (1,000 cfm)		EA					
	Electrical Room Exhaust Fan EAF-6 (350 cfm)		EA					
	Motor Starter/Disconnect Switch		EA					
	Subtotal							

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Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
15950	Testing, Adjusting, and Balancing Local Thermostats for Exhaust Fans Start-up, Testing & Commissioning		LS LS					
	Subtotal							
Division 16	ELECTRICAL							
16020	Temporary Electrical System Temporary Power and Light		GSF					
	Subtotal							
16050	Basic Electrical Materials and Methods (Included w/ 16130)							
16055	Electrical Requirements for Shop-Assembled Equipment (Included w/ 16130)							
16060	Grounding Grounding		GSF					
	Subtotal							
16071	Supporting Devices (Included w/ 16130)							
16075	Electrical Identification (Included w/ 16130)							
16080	Electrical Testing Requirements (Included w/ 16130)							

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
16121	Wires and Cables-600 Volts and Below							
	Fire Alarm							
	Smoke Detectors		EA					
	Manual Pull Stations		EA					
	Fan Start-Up/Status/Shutdown Relay		LS					
	Tempered switch		LS					
	Testing/Programming/Software		LS					
	Subtotal							
16130	Electrical Raceway Systems							
	Service & Distribution							
	Feeders and Conduit from POS to Electrical Room (1) 2" RGS Raceway Concrete Encased		LF					
	Increase feeders and conduit to 4-4/0 in 3" EC		LF					
	Service End Box		EA					
	Splices		EA					
	Grounding		EA					
	Generator Tap Box (NEMA 4X)		EA					
	Kirk Key interlock		EA					
	Surge Protection Device		LS					
	Normal Elec & Feeders		EA					
	Fdrs from PP-1 to LP-1, LP-2 (4#1+#8GND in 1-1/4"RGS)		LF					
	Furnish and install GMCC-1		EA					
	NEMA 4X enclosure		EA					
	Fdrs from PP-1 to GMCC-1 (4#1+#8GND in 1-1/4"RGS)		LF					
	Fdrs from PP-1 to Generator Tap Box		LF					
	Electric Panels							
	Furnish and install 2 100A distribution panels (LP-1)		EA					
	NEMA 4X enclosure for LP-1		EA					
	Furnish Main Service 200A Switch Bd PP-1		EA					
	Increased size to 250A bus and 225A MCB		EA					
	NEMA 4X enclosure for PP-1		EA					
	Subtotal							

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DDC ID: S195-227S

Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
16132	Underground Electrical Distribution System (Included w/ 16210)							
16140	Wiring Devices							
	Duplex outlets		EA					
	Duplex outlets (WP)		EA					
	Duplex outlets (Floor)		EA					
	All receptacles to be GFCI and weather proof		EA					
	Add GFCI WP receptacles on roof		EA					
	Wiring		LF					
	Installation		MH					
	Subtotal							
16210	Electrical Service							
	Connection to EAF-1 (1 HP per elec)		EA					
	Feeder from GMCC-1 to EAF		LF					
	Connection to EAF-2 (1 HP per elec)		EA					
	Feeder from GMCC-1 to EAF		LF					
	Connection to EAF-3 (1 HP per elec)		EA					
	Feeder from GMCC-1 to EAF		LF					
	Connection to EAF-4 (1 HP per elec)		EA					
	Feeder from GMCC-1 to EAF		LF					
	Connection to EAF-5 (1 HP per elec)		EA					
	Feeder from GMCC-1 to EAF		LF					
	Connection to EAF-6 (1/2 HP per mech)		LS					
	Feeder from GMCC-1 to EAF		EA					
	Connection to Gate 1 (Disconnect switch only)		EA					
	Feeder from PP-1 to Gate 1		LF					
	Connection to Gate 2 (Disconnect switch only)		EA					
	Feeder from PP-1 to Gate 2		LF					
	Connection to Stormwater Pump		EA					

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Feeder from PP-1 to Stormwater Pump		LF					
	Connection to Door 1 (Disconnect Switch only)		EA					
	Feeder from PP-1 to Door 1		LF					
	Connection to Pump 1		EA					
	Feeder from PP-1 to Pump		LF					
	Connection to Pump 2		EA					
	Feeder from PP-1 to Pump		LF					
	Add connection to motorized damper		LS					
	Add feeder to motorized damper		LF					
	NEMA 4X enclosure for all disconnect switches		EA					
	Subtotal							
16220	Electric Motors (Included w/ 16210)							
16411	Disconnect Switches (Included w/ 16210)							
16443	Panelboards (Included w/ 16130)							
16491	Control Components and Devices (Included w/ 16500)							
16500	Lighting Equipment Lamps and Ballasts							
	All light fixtures		LS					
	All light fixtures - adjustment		LS					
	Add Type F1 Light pole		EA					

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PLA PROJECT

**ATTACHMENT 1 - BID INFORMATION
PROJECT ID: S195-227S**

DESCRIPTION AND LOCATION OF WORK:

Spring Street Salt Shed Construction
553 Canal Street
Manhattan, NY 10013
E-PIN: 85014B0016 / DDC PIN: 8502014TR0001C

DOCUMENTS AVAILABLE AT:

Department of Design and Construction, Contract Section
30-30 Thomson Avenue - First Floor, Long Island City, NY 11101

SUBMISSION OF BIDS BEFORE BID OPENING:

TIME TO SUBMIT:

On or Before: **WEDNESDAY, OCTOBER 9, 2013**
BIDS MUST BE CLOCKED IN PRIOR TO BID OPENING

PLACE TO SUBMIT:

Department of Design and Construction, Contract Section (located behind Security Desk)
30-30 Thomson Avenue - First Floor, Long Island City, NY 11101

BID OPENING:

PLACE OF BID OPENING:	Department of Design and Construction Contract Section 30-30 Thomson Avenue – First Floor Long Island City, NY 11101
DATE AND HOUR:	WEDNESDAY, OCTOBER 9, 2013 @ 2:00 PM
	LATE BIDS WILL NOT BE ACCEPTED

PRE-BID CONFERENCE:

PLACE	Spring Street Salt Shed Construction 553 Canal Street New York, NY 10013
DATE AND HOUR	WEDNESDAY, SEPTEMBER 25, 2013 AT 10:00AM
MANDATORY OR OPTIONAL	OPTIONAL

BID SECURITY:

Bid Security is required in the amount set forth below; provided, however, bid security is not required if the TOTAL BID PRICE set forth on the Bid Form is less than \$1,000,000.

- (1) Bond in an amount not less than 10% of the TOTAL BID PRICE set forth on the Bid Form, OR
- (2) Certified Check in an amount not less than 2% of the TOTAL BID PRICE set forth on the Bid Form

PERFORMANCE AND PAYMENT SECURITY:

Required for Contracts in excess of \$1,000,000.00. Performance and Payment Security shall each be in an amount equal to 100% of the Contract Price

AGENCY CONTACT PERSON:

Lorraine Holley, 30-30 Thomson Avenue - First Floor, Long Island City, Queens, NY 11101
Telephone (718) 391-2200 or (718) 391-2608 Fax: (718) 391-2615



**BID BOOKLET
PART B**

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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.

1. Bidder Information:

Company Name: _____

DDC Project Number: _____

Company Size: _____ Ten (10) employees or less

_____ Greater than ten (10) employees

_____ Company has previously worked for DDC

2. Type(s) of Construction Work

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 contractor may obtain its EMR by contacting its insurance broker or the NCCI. If the contractor cannot obtain its EMR, it must submit a written explanation as to why.

The Contractor 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	<u>INTRASTATE RATE</u>	<u>INTERSTATE RATE</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the Intrastate and/or Interstate EMR for any of the past three years is greater than 1.00, the 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:

_____ Contractor has received a willful violation issued by OSHA or New York City Department of Buildings (NYCDOB) within the last three years.

_____ Contractor has had an incident requiring OSHA notification within 8 hours (i.e., fatality, or hospitalization of three or more employees).

The Occupational Safety and Health Act (OSHA) of 1970 requires employers with ten or more employees, on a yearly basis to complete and maintain on file the form entitled "Log of Work-related Injuries and Illnesses". This form is commonly referred to as the OSHA 300 Log (OSHA 200 Log for 2001 and earlier).

The OSHA 300 Log must be submitted for the last three years for contractors with more than ten employees.

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

The contractor must submit the Incident Rate for Lost Time Injuries (the Incident Rate) for the past three 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 300 Log. The 200,000 hours represents the equivalent of 100 employees working forty hours a week, fifty weeks per year.

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

YEAR	TOTAL NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the 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 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)

_____ Contractor previously audited by the DDC Office of Site Safety.

DDC Project Number(s): _____

_____ Accident on previous DDC Project(s).

_____ Fatality or Life-altering Injury on DDC Project(s) within the last three years.
 [Examples of a life-altering injury include loss of limb, loss of a sense (e.g., sight, hearing), or loss of neurological function].

Date: _____

By: _____
 (Signature of Owner, Partner, Corporate Officer)

Title: _____

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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 facsimile or in writing and will specify the types of information which must be submitted.

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 on pages 28 through 30 of this Bid Booklet. The Project Reference Form consists of 3 parts: (1) Similar 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 shall submit such additional information as the Commissioner may require, including without limitation, an explanation or justification for specific unit price items.

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

A. PROJECT REFERENCES - SIMILAR CONTRACTS COMPLETED BY THE BIDDER

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

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

B. PROJECT REFERENCES - CONTRACTS CURRENTLY UNDER CONSTRUCTION BY THE BIDDER

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

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

C. PROJECT REFERENCES - 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

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OFFICE OF THE MAYOR
BUREAU OF LABOR SERVICES
CONTRACT CERTIFICATE

To be completed if the contract is less than \$1,000,000

Contractor: _____

Address: _____

Telephone Number: _____

Name and Title of Signatory: _____

Contracting Agency or Owner: _____

Project Number: _____

Proposed Contract Amount: _____

Description and Address of Proposed Contract: _____

Names of Subcontractors in the amount of 750,000 or more on this contract (if not known at this time, so state indicating that trades will be subcontracted):

I, (fill in name of person signing) _____,
hereby affirm that I am authorized by the above-named contractor to certify that said contractor's
proposed contract with the above-named owner or city agency is less than \$1,000,000. This affirmation
is made in accordance with Executive Order No. 50 (1980) as amended and its implementing regulations.

Date

Signature

**WILLFUL OR FRAUDULENT FALSIFICATION OF ANY DATA OR INFORMATION
SUBMITTED HEREWITH MAY RESULT IN THE TERMINATION OF ANY CONTRACT BETWEEN
THE CITY AND THE BIDDER OR CONTRACTOR AND BAR THE BIDDER OR CONTRACTOR FROM
PARTICIPATION IN ANY CITY CONTRACT FOR A PERIOD OF UP TO THREE YEARS. FURTHER,
SUCH FALSIFICATION MAY RESULT IN CRIMINAL PROSECUTION.**

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VENDEX COMPLIANCE

Vendex Fees: Pursuant to Procurement Policy Board Rule 2-08(f)(2), the contractor will be charged a fee for the administration of the VENDEX system, including the Vendor Name Check process, if a Vendor Name Check review is required to be conducted by the Department of Investigation. The contractor shall also be required to pay the applicable required fees for any of its subcontractors for which Vendor Name Check reviews are required. The fee(s) will be deducted from payments made to the contractor under the contract. For contracts with an estimated value of less than or equal to \$1,000,000, the fee will be \$175 per Vendor Name Check review. For contracts with an estimated value of greater than \$1,000,000, the fee will be \$350 per Vendor Name Check review.

(B) **Confirmation of Vendex Compliance:** The Bidder shall submit this Confirmation of Vendex Compliance to the Department of Design and Construction, Contracts Section, 30-30 Thomson Avenue – First Floor, Long Island City, NY 11101.

Bid Information: The Bidder shall complete the bid information set forth below.

Name of Bidder: _____
Bidder's Address: _____
Bidder's Telephone Number: _____
Bidder's Fax Number: _____
Date of Bid Opening: _____
Project ID: _____

Vendex Compliance: To demonstrate compliance with Vendex requirements, the Bidder shall complete either Section (1) or Section (2) below, whichever applies.

- (1) **Submission of Vendex Questionnaires to MOCS:** By signing in the space provided below, the Bidder certifies that as of the date specified below, the Bidder has submitted Vendex Questionnaires to the Mayor's Office of Contract Services, Attn: VENDEX, 253 Broadway, 9th Floor, New York, New York 10007.

Date of Submission: _____

By: _____
(Signature of Partner or corporate officer)

Print Name: _____

- (2) **Submission of Certification of No Change to DDC:** By signing in the space provided below, the Bidder certifies that it has read the instructions in a "Vendor's Guide to Vendex" and that such instructions do not require the Bidder to submit Vendex Questionnaires. The Bidder has completed **TWO ORIGINALS** of the Certification of No Change set forth on the next page of this Bid Booklet.

By: _____
(Signature of Partner or corporate officer)

Print Name: _____

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Principal Questionnaire

This section refers to the most recent principal questionnaire submissions.

Principal Name

Date of signature
on last full Principal
Questionnaire

Date(s) of signature on
submission of change

1

2

3

4

5

6

Check if additional changes were submitted and attach a document with the date of additional submissions.

Certification *This section is required.*

This form must be signed and notarized. Please complete this twice. Copies will not be accepted.

Certified By:

Name (Print)

Title

Name of Submitting Entity

Signature

Date

Notarized By:

Notary Public

County License Issued

License Number

Sworn to before me on: _____
Date

Certificate of No Change Form



- Please submit two completed forms. Copies will not be accepted.
- Please send both copies to the agency that requested it, unless you are advised to send it directly to the Mayor's Office of Contract Services (MOCS).
- A materially false statement willfully or fraudulently made in connection with this certification, and/or the failure to conduct appropriate due diligence in verifying the information that is the subject of this certification, may result in rendering the submitting entity non-responsible for the purpose of contract award.
- A materially false statement willfully or fraudulently made in connection with this certification may subject the person making the false statement to criminal charges

I, _____, being duly sworn, state that I have read
Enter Your Name

and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.

In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.

I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.

Vendor Questionnaire *This section is required.*

This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.

Name of Submitting Entity: _____

Vendor's Address: _____

Vendor's EIN or TIN: _____ Requesting Agency: _____

Are you submitting this Certification as a parent? (Please circle one) Yes No

Signature date on the last full vendor questionnaire signed for the submitting vendor: _____

Signature date on change submission for the submitting vendor: _____

Principal Questionnaire

This section refers to the most recent principal questionnaire submissions.

Principal Name

Date of signature
on last full Principal
Questionnaire

Date(s) of signature on
submission of change

1

2

3

4

5

6

Check if additional changes were submitted and attach a document with the date of additional submissions.

Certification *This section is required.*

The form must be signed and notarized. Please complete this twice. Copies will not be accepted.

Certified By:

Name (Print)

Title

Name of Submitting Entity

Signature

Date

Notarized By:

Notary Public

County License Issued

License Number

Sworn to before me on: _____
Date

Certificate of No Change Form



- Please submit two completed forms. Copies will not be accepted.
- Please send both copies to the agency that requested it, unless you are advised to send it directly to the Mayor's Office of Contract Services (MOCS).
- A materially false statement willfully or fraudulently made in connection with this certification, and/or the failure to conduct appropriate due diligence in verifying the information that is the subject of this certification, may result in rendering the submitting entity non-responsible for the purpose of contract award.
- A materially false statement willfully or fraudulently made in connection with this certification may subject the person making the false statement to criminal charges

I, _____, being duly sworn, state that I have read
Enter Your Name

and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.

In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.

I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.

Vendor Questionnaire *This section is required.*

This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.

Name of Submitting Entity: _____

Vendor's Address: _____

Vendor's EIN or TIN: _____ Requesting Agency: _____

Are you submitting this Certification as a parent? (Please circle one) Yes No

Signature date on the last full vendor questionnaire signed for the submitting vendor: _____

Signature date on change submission for the submitting vendor: _____

IRAN DIVESTMENT ACT COMPLIANCE RIDER
FOR NEW YORK CITY CONTRACTORS

The Iran Divestment Act of 2012, effective as of April 12, 2012, is codified at State Finance Law ("SFL") §165-a and General Municipal Law ("GML") §103-g. The Iran Divestment Act, with certain exceptions, prohibits municipalities, including the City, from entering into contracts with persons engaged in investment activities in the energy sector of Iran. Pursuant to the terms set forth in SFL §165-a and GML §103-g, a person engages in investment activities in the energy sector of Iran if:

- (a) The person provides goods or services of twenty million dollars or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
- (b) The person is a financial institution that extends twenty million dollars or more in credit to another person, for forty-five days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to paragraph (b) of subdivision three of Section 165-a of the State Finance Law and maintained by the Commissioner of the Office of General Services.

A bid or proposal shall not be considered for award nor shall any award be made where the bidder or proposer fails to submit a signed and verified bidder's certification.

Each bidder or proposer must certify that it is not on the list of entities engaged in investment activities in Iran created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. In any case where the bidder or proposer cannot certify that they are not on such list, the bidder or proposer shall so state and shall furnish with the bid or proposal a signed statement which sets forth in detail the reasons why such statement cannot be made. The City of New York may award a bid to a bidder who cannot make the certification on a case by case basis if:

- (1) The investment activities in Iran were made before the effective date of this section (i.e., April 12, 2012), the investment activities in Iran have not been expanded or renewed after the effective date of this section and the person has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran: or
- (2) The City makes a determination that the goods or services are necessary for the City to perform its functions and that, absent such an exemption, the City would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

**BIDDER'S CERTIFICATION OF COMPLIANCE WITH
IRAN DIVESTMENT ACT**

Pursuant to General Municipal Law §103-g, which generally prohibits the City from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the bidder/proposer submits the following certification:

[Please Check One]

BIDDER'S CERTIFICATION

- By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer 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, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.

- I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: _____, New York
 _____, 20__

SIGNATURE

PRINTED NAME

TITLE

Sworn to before me this
____ day of _____, 20__

Notary Public

Dated:

CITY OF NEW YORK

DIVISION OF LABOR SERVICES

CONSTRUCTION EMPLOYMENT REPORT

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The City of New York Department of Small Business Services
Division of Labor Services Contract Compliance Unit
110 William Street, New York, New York 10038
Phone: (212) 513 - 6323
Fax: (212) 618-8879

CONSTRUCTION EMPLOYMENT REPORT

GENERAL INFORMATION

1. Your contractual relationship in this contract is: Prime contractor Subcontractor
- 1a. Are M/WBE goals attached to this project? Yes No
2. Please check one of the following if your firm would like information on how to certify with the City of New York as a:
 Minority Owned Business Enterprise Locally based Business Enterprise
 Women Owned Business Enterprise Emerging Business Enterprise
- 2a. If you are certified as an **MBE, WBE, or LBE**, what city/state agency are you certified with?
_____ Are you DBE certified? Yes No
3. Please indicate if you would like assistance from SBS in identifying certified M/WBEs for contracting opportunities: Yes No
4. Is this project subject to a project labor agreement? Yes No

PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

5. _____
Employer Identification Number or Federal Tax I.D./ _____ Email Address
6. _____
Company Name
7. _____
Company Address and Zip Code
8. _____
Chief Operating Officer Telephone Number
9. _____
Designated Equal Opportunity Compliance Officer Telephone Number
(If same as Item #7, write "same")
10. _____
Name of Prime Contractor and Contact Person
(If same as Item #5, write "same")
11. Number of employees in your company: _____

12. Contract information:

(a) _____ (b) _____
Contracting Agency (City Agency) Contract Amount

(d) _____ (e) _____
Procurement Identification Number (PIN) Contract Registration Number (CT#)

(f) _____ (g) _____
Projected Commencement Date Projected Completion Date

(h) Description and location of proposed contract:

13. Has your firm been reviewed by the Division of Labor Services (DLS) within the past 36 months and issued a Certificate of Approval? Yes___ No___

If yes, attach a copy of certificate.

14. Has DLS within the past month reviewed an Employment Report submission for your company and issued a Conditional Certificate of Approval? Yes___ No___

If yes, attach a copy of certificate.

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

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

Yes___ No___ If yes,

Date submitted: _____

Agency to which submitted: _____

Name of Agency Person: _____

Contract No: _____

Telephone: _____

16. Has your company in the past 36 months been audited by the United States Department of Labor, Office of Federal Contract Compliance Programs (OFCCP)? Yes___ No___

If yes,

(a) Name and address of OFCCP office.

(b) Was a Certificate of Equal Employment Compliance issued within the past 36 months?
Yes___ No___

If yes, attach a copy of such certificate.

(c) Were any corrective actions required or agreed to? Yes___ No___

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

(d) Were any deficiencies found? Yes___ No___

If yes, attach a copy of such findings.

17. Is your company or its affiliates a member or members of an employers' trade association which is responsible for negotiating collective bargaining agreements (CBA) which affect construction site hiring? Yes___ No___

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

PART II: DOCUMENTS REQUIRED

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

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

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

- | | |
|--|--------------|
| (a) Prior to job offer | Yes___ No___ |
| (b) After a conditional job offer | Yes___ No___ |
| (c) After a job offer | Yes___ No___ |
| (d) Within the first three days on the job | Yes___ No___ |
| (e) To some applicants | Yes___ No___ |
| (f) To all applicants | Yes___ No___ |
| (g) To some employees | Yes___ No___ |
| (h) To all employees | Yes___ No___ |

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

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

If yes, is the medical examination given:

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

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

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

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

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

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

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

If yes, please attach a copy of this policy.

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

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

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

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

If yes, attach a log. See instructions.

27. Are there any jobs for which there are physical qualifications? Yes___ No___

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

28. Are there any jobs for which there are age, race, color, national origin, sex, creed, disability, marital status, sexual orientation, or citizenship qualifications? Yes___ No___

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

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SIGNATURE PAGE

I, (print name of authorized official signing) _____ hereby certify that the information submitted herewith is true and complete to the best of my knowledge and belief and submitted with the understanding that compliance with New York City's equal employment requirements, as contained in Chapter 56 of the City Charter, Executive Order No. 50 (1980), as amended, and the implementing Rules and Regulations, is a contractual obligation.

I also agree on behalf of the company to submit a certified copy of payroll records to the Division of Labor Services on a monthly basis.

Contractor's Name

Name of person who prepared this Employment Report

Title

Name of official authorized to sign on behalf of the contractor

Title

Telephone Number

Signature of authorized official

Date

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

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

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

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

Only original signatures accepted.

Sworn to before me this _____ day of _____ 20 _____

Notary Public

Authorized Signature

Date

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FMS ID: S195-227S



**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

Spring Street Salt Shed Construction

**LOCATION: 553 Canal Street
BOROUGH: Manhattan 10013
CITY OF NEW YORK**

Contractor

Dated _____, 20____

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____, 20____





PROJECT ID: S195-227S

**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

LAW

VOLUME 2 OF 3

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

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

Spring Street Salt Shed Construction

LOCATION:
BOROUGH:
CITY OF NEW YORK

553 Canal Street
Manhattan 10013

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

Dept of Sanitation

Dattner Architects

Date: August 2, 2013

4-0 18







NEW YORK CITY DEPARTMENT OF
DESIGN + 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

VOLUME 2 OF 3

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

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





NOTICE:

THIS CONTRACT IS NOT SUBJECT TO THE REQUIREMENTS OF THE WICKS LAW FOR SEPARATE PRIME CONTRACTORS

This contract is subject to a Project Labor Agreement ("PLA"). In accordance with the Labor Law, the requirements of the Wicks Law for separate prime contractors do not apply to any project that is covered by a PLA. Accordingly, the requirements of the Wicks Law for separate prime contractors do not apply to this Project. However, the Contract Documents for this Project (General Conditions, Drawings and Specifications) were prepared as if the requirements of the Wicks Law for separate prime contractors did apply. To correct this situation, the bidder is advised that the Contract Documents are revised as set forth below.

- (A) Delete any and all references to separate responsibilities, separate specifications, separate drawings and/or separate contracts for the four subdivisions of the work listed below:
- General Construction Work (Contract No. 1)
 - Plumbing Work (Contract No. 2)
 - HVAC & Fire Protection Work (Contract No. 3)
 - Electrical Work (Contract No. 4)
- (B) Revise all such references to indicate that:
- The Project consists of a single contract, the Contract for General Construction Work.
 - All responsibilities and obligations in the Contract Documents assigned to the separate Contractors for the four subdivisions of the work listed above are the responsibility of the Contractor for General Construction Work.
 - The Contractor for General Construction Work is responsible for the performance of all required work for the Project as set forth in the Contract Documents, including all responsibilities and obligations assigned to the separate Contractors for the four subdivisions of the work listed above.
- (C) Revise any and all references to Contacts Nos. 2, 3 and 4 to refer to Contract No. 1.
- (D) Revise the specifications for plumbing work to require Contractor for General Construction Work to engage a Licensed Plumber to perform the required plumbing work.
- (E) Revise the specifications for electrical work to require Contractor for General Construction Work to engage a Licensed Electrician to perform the required electrical work.

NOTICE:

THIS CONTRACT IS SUBJECT TO A PROJECT LABOR AGREEMENT

This contract is subject to the attached Project Labor Agreement ("PLA") entered into between the City and the Building and Construction Trades Council of Greater New York ("BCTC") affiliated Local Unions. By submitting a bid, the Contractor agrees that if awarded the Contract the PLA is binding on the Contractor and all subcontractors of all tiers. The bidder to be awarded the contract will be required to execute the attached Letter of Assent prior to award. Contractor shall include in any subcontract a requirement that the subcontractor, and sub-subcontractors of all tiers, become signatory to and bound to the ~~PLA~~ with respect to the subcontracted work. Contractor will also be required to have all subcontractors of all tiers execute the attached Letter of Assent prior to such subcontractors performing any work on the Project. Bidders are advised that the City of New York and City agencies have entered into multiple PLAs. The terms of each PLA, while similar, are not identical. All bidders should carefully read the entire PLA that governs this Contract.

To the extent that the terms of the PLA conflict with any other terms of the invitation for bids, including the Standard Construction Contract, the terms of the PLA shall govern. For example, the PLA section that authorizes the scheduling of a four-day work, ten hours per day on straight time at the commencement of the job, PLA Article 12, section 1, overrides the Standard Construction Contract's provision concerning a five-day work week with a maximum of eight hours in a day, Standard Construction Contract Article 37.2.1. Where, however, the invitation for bids, including the Standard Construction Contract, requires the approval of the City/Department, the PLA does not supersede or eliminate that requirement.

In addition to the various provisions regarding work rules, Contractors should take special note of the requirement that Contractors and Subcontractors make payments to designated employee benefit funds. See PLA Article 11, Section 2. The PLA also contains provisions for what occurs when a contractor or a subcontractor fails to make required payments into the benefit funds, including potentially the direct payment by the City to the benefit fund of monies owed and corresponding withholding of payments to the Contractor. See PLA Article 11, Section 2. The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

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

If this Contract is subject to the Minority-Owned and Women-Owned Business Enterprise ("M/WBE") program created by Local Law 129, the specific requirements of M/WBE participation for this Contract are set forth in Schedule B entitled the "Subcontractor Utilization Plan", and are detailed in a separate Notice to Prospective Contractors included with this bid package. If such requirements are included with this Contract, the City strongly advises Contractors to read those provisions, as well as PLA Article 4, Section 2(C), carefully. A list of M/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) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th 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.

The local collective bargaining agreements (CBAs) that are incorporated into the PLA as PLA Schedule A Agreements are available on computer disk from the Department's Contract Officer upon the request of any prospective bidder. Please note that the "PLA Schedule A" is distinct from the Department's Schedule A that is a part of this invitation for bids.

A contact list for the participating unions is set forth after the FAQs.

Below are answers to frequently asked questions (FAQs) about this PLA:

Q1. Does a contractor need to be signatory with the unions in the NYC Building and Construction Trades Council in order to bid on projects under the PLA?

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

Q2. Does a contractor agreeing to the PLA and signing the Letter of Assent create a labor agreement with these unions outside of the project covered by the PLA?

A. No, the PLA applies only to those projects that the Contractor agrees to perform under the PLA and makes no labor agreement beyond those projects.

Q3. Does the PLA affect the subcontractors that a bidder may utilize on the project?

A. Subject to the Department's approval of subcontractors pursuant to Article 17 of the Standard Construction Contract, a contractor may use any subcontractor, union or non-union, as long as the subcontractor signs and agrees to the terms of the PLA.

Q4. Are bidders required to submit Letters of Assent signed by proposed subcontractors with their bid in order to be found responsive?

A. No, bidders do not have to submit signed Letters of Assent from their subcontractors with their bid. Subcontractors, however, will be required to sign the letter of Assent prior to being approved by the Department.

Q5. May a contractor or subcontractor use any of its existing employees to perform this work?

A. Generally labor will be referred to the contractor from the respective signatory local unions. See PLA Article 4. However, contractors and subcontractors may continue to use up to 12% of their existing, qualifying labor force for this work, in accordance with the terms of PLA Article 4, Section 2B. Certified MWBEs for which participation goals are set pursuant to NYC Administrative Code §6-129 that are not signatory to any Schedule A CBAs may use their existing employees for the 2nd, 4th, 6th and 8th employee needed on the job if their contracts are valued at or under \$500,000. For contracts valued at above \$500,000 but under \$1,000,000, such certified MWBEs may use their own employees for the 2nd, 5th and 8th employees needed on the job in accordance with the provisions of PLA Article 4, Section 2C. If additional workers are needed by these MWBEs, the additional workers will be referred to the contractor from the signatory local unions subject to the contractor's right to meet 12% of the additional needs with its existing, qualifying employees.

Q6. Must the City set MWBE participation goals for the particular project or contract in order for a certified MWBE to utilize the provisions of PLA Article 4, Section 2C?

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

Q7. May a contractor bring in union members from locals that are not signatory unions?

A. Referrals will be from the respective signatory locals and/or locals listed in schedule A of the PLA. Contractors may utilize 'traveler provisions' contained in the local collective bargaining agreements (local CBAs) where such provisions exist and/or in accordance with the provisions of PLA Article 4, Section 2.

Q8. Does a non-union employee working under the PLA automatically become a union member?

A. No, the non-union employee does not automatically become a union member by working on a project covered by the PLA. Non-union employees working under the PLA are subject to the union security provisions (i.e., union dues/agency shop fees) of the local CBAs while on the project. These employees will be enrolled in the appropriate benefit plans and earn credit toward various union benefit programs. See PLA Article 4, Section 6 and Article 11.

Q9. Are all contractors and subcontractors working under the PLA, including non-union contractors and contractors signatory to collective bargaining agreements with locals other than those that are signatories to the PLA, required to make contributions to designated employee benefit funds?

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

Q10. What happens if a contractor or subcontractor fails to make a required payment to a designated employee benefit fund?

A. The PLA sets forth a process for unions to address a contractor or a subcontractor's failure to make required payments. The process includes potentially the direct payment by the City to the benefit fund of monies owed and the corresponding withholding of payments to the Contractor. See PLA Article 11, Section 2. The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

Q11. Does signing on to the PLA satisfy the Apprenticeship Requirements established for this bid?

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

Q12. Does the PLA provide a standard work day across all the signatory trades?

A. Yes, all signatory trades will work an eight (8) hour day, Monday through Friday with a day shift at straight time as the standard work week. The PLA also permits a contractor to schedule a four day [within Monday through Friday] work week, ten (10) hours per day at straight time if announced at the commencement of the project. See PLA Article 12, Section 1. This is an example where the terms of the PLA override provisions of the Standard Construction Contract (compare with section 37.2 of the Standard Construction Contract).

Q13. Does the PLA create a common holiday schedule for all the signatory trades?

A. Yes, the PLA recognizes eight (8) common holidays. See PLA Article 12, Section 4.

Q14. Does the PLA provide for a standard policy for 'shift work' across all signatory trades?

A. Yes, second and third shifts may be worked with a standard 5% premium pay. In addition, a day shift does not have to be scheduled in order to work the second and third shifts at the 1.05 hourly pay rate. See PLA Article 12, Section 3.

Q15. May the Contractor schedule overtime work, including work on a weekend?

A. Yes, the PLA permits the Contractor to schedule overtime work, including work on the weekends. See PLA Article 12, Sections 2, 3, and 5. To the extent that the Agency's approval is required before a Contractor may schedule or be paid for overtime, that approval is still required notwithstanding the PLA language.

Q16. Are overtime payments affected by the PLA?

A. Yes, all overtime pay incurred Monday through Saturday will be at time and one half (1 ½). There will be no stacking or pyramiding of overtime pay under any circumstances. See PLA Article 12, Section 2. Sunday and holiday overtime will be paid according to each trades CBA.

Q17. Are there special provisions for Saturday work when a day is 'lost' during the week due to weather, power failure or other emergency?

A. Yes, when this occurs the Contractor may schedule Saturday work at weekday rates. See PLA Article 12, Section 5.

Q18. Does the PLA contain special provisions for the manning of Temporary Services?

A. Yes. Where temporary services are required by specific request of the agency or construction manager, they shall be provided by the contractor's existing employees during working hours in which a shift is scheduled for employees of the contractor. The need for temporary services during non-working hours will be determined by the agency or construction manager. There will be no stacking of trades on temporary services. See PLA Article 15.

Q19. What do the workers get paid when work is terminated early in a day due to inclement weather or otherwise cut short of 8 hours?

A. The PLA provides that employees who report to work pursuant to regular schedule and not given work will be paid two hours of straight time. Work terminated early for severe weather or emergency conditions will be paid only for time actually worked. In other instances where work is terminated early, the worker will be paid for a full day. See PLA Article 12, Sections 6 and 8.

Q20. Should a local collective bargaining agreement [local CBA] expire during the project will a work stoppage occur on a project subject to the PLA?

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

Q21. May a contractor working under the PLA be subject to a strike or other boycott activity by a signatory union at another site while the contractor is a signatory to the PLA?

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

Q22. If a contractor has worked under other PLAs in the New York City area, are the provisions in this PLA generally the same as the others?

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

Q23. What happens if a dispute occurs between the contractor and an employee during the project?

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

Q24. What happens if there is a dispute between locals as to which local gets to provide employees for a particular project or a particular aspect of a project?

A. The PLA provides for jurisdictional disputes to be resolved in accordance with the NY Plan. See PLA Article 10. A copy of the NY Plan is available upon request from the Department. The PLA provides that work is not to be disrupted or interrupted pending the resolution of any jurisdictional dispute. The work proceeds as assigned by the contractor until the dispute is resolved. See PLA Article 10, Section 3.

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CONTACT INFORMATION FOR LOCAL UNIONS

BOILER MAKERS LOCAL NO. 5

24 Van Siclen Avenue
Floral Park, NY 11001
Phone: (516) 326-2500
Fax: (516) 326-3435
Thomas Klein, Bus. Mgr.
boilermakers5@optonline.net

BLASTERS & DRILLERS LOCAL NO. 29

43-12 Ditmars Blvd.
Astoria, NY, 11105
Phone: (718) 278-5800
Thomas Russo, bus mgr.

BRICKLAYERS LOCAL NO. 1

Santo Lanzafame (718) 392-0525

BUILDING TRADES

71 West 23rd Street, Suite 501
New York, NY 10010
Phone: (212) 647-0700
Fax: (212) 647-0705
John Barnett, Chairman

CARPENTERS DISTRICT COUNCIL

395 Hudson Street
New York, New York 10014
Phone: (212) 366-7500
Fax: (212) 675-3140
Michael J. Forde, Executive Secy Treas.
Peter Thomassen, President
Denis Sheil, V.P.
Ronald Rawald, D.C. Rep.
carpmik@aol.com

CEMENT MASONS NO. 780

150-42 12th Avenue
Whitestone, NY 11357
Phone: (718) 357-3750
Fax: (718) 357-2057
Angelo Scagnelli, Bus. Mgr.
Paul M. Mantia, President
Angelolocal780@yahoo.com

CONCRETE WORKERS DISTRICT COUNCIL NO. 16

29-18 35th Avenue
Long Island City, NY 11106
Phone: (718) 392-5077
Fax: (718) 392-5087
Alex Castaldi, Pres. Bus. Mgr.
Ccwdc16@yahoo.com

DERRICKMEN AND RIGGERS CONCRETE WORKERS

25-19 43rd Avenue
Long Island City, NY 11101
Phone: (718) 361-6534

Fax: (718) 361-6584
Joseph McDonald, Bus. Agent
joemac197@aol.com

DRYWALL TAPERS 1974

265 West 14th Street
New York, NY 10011
Phone: (212) 242-8500
Fax: (212) 242-2356
Joseph Giordano, Bus. Mgr.
Salvatore Marsala, Org.
Maurice Maynard, Org.
Ellior Santiago, Org.
Vincent Calderone, Org.
Ann Juliano Union Sec.
Local1974@aol.com

ELECTRICAL LOCAL NO. 3

158-11 Harry Van Arsdale, Jr. Avenue
Flushing, NY 113656
Phone: (718) 591-4000
Fax: (718) 380-8998
Christopher Erikson, Bus. Mgr.
John E. Marchell, President
Raymond Melville, Asst. Bus. Mgr. Construction
Paul Ryan, Asst. Bus. Mgr. Westchester/Fairfield
Luis Restrepo, Asst. Bus. Mgr.
Mark G. Hansen, Bus. Rep.
Elliot Hecht, Bus. Rep.
Raymond Kitson, Bus. Rep.
Austin McCann, Bus. Rep.
Robert Olenick, Bus. Rep.
Michael O'Neill, Bus. Rep.
Joseph Santigate, Bus. Rep.
Louis Sciara, Bus. Rep.
Lance Van Arsdale, Asst. Bus. Maintenance Division
Ray West, Bus. Rep.
mail@local3ibew.org

ELEVATOR CONSTRUCTORS NO. 1

47-24 27th Avenue
Long Island City, NY 11101
Phone: (718) 767-7004
Fax: (718) 767-6730
Lenny Legotte, Pres. Bus. Mgr.
Thomas Moore, Bus. Agent
Gary Riefenhauser, Bus. Agent
Fred McCourt, Bus. Agent
Robert Stork, Bus. Agent
llegotte@localoneiuec.com
snoble@localoneiuec.com

ENGINEERS NO. ENGINEERS LOCAL UNION NO. 14

141-57 Northern Boulevard
Flushing, NY 11354
Phone: (718) 939-0600
Fax: (718) 939-3131
Edwin Christian, Pres. Bus. Mgr.

Christopher Confrey, Bus. Rep. Rec Sec.
John R. Powers, Bus. Rep. Treas.
engineers@iuoelocal14.com

ENGINEERS NO. 15, 15A, 15B, 15C, 15D

265 West 14th Street
New York, NY 10011
Phone: (212) 929-5327-8-9
Fax: (212) 206-0357
James T. Callahan, Pres. & Bus. Mgr.
Robert G. Shaw, Bus. Rep. & V.P.
Charles Gambino, Bus. Rep., Fin. Sec.
Brian S. Kelly, Bus. Rep. & Rec. Sec.
Daniel Schneider, Bus. Rep. & Treasurer
Gregg Nolan, Bus. Rep.
Christopher Thomas, Bus. Rep.
Bruce Murphy, Director of Training

ENGINEERS NO. 30

115-06 Myrtle Avenue
Richmond Hill, NY 11418
Phone: (718) 847-8484
Fax: (718) 850-0524
John T. Ahern, Bus. Mgr.

ENGINEERS No. 94

331-337 West 44th Street
New York, NY 10036
Phone: (212) 245-7040 Fax: (212) 245-7886
Kuba Brown, Bus. Mgr. & President
kubabrown@local94.com

GLAZERS NO. 1281

45 West 14th Street
New York, NY 10011
Phone: (212) 924-5200
Fax: (212) 255-1151
William Elfeld, Bus. Rep.

HEAT & FROST INSULATORS AND ASBESTOS WORKERS LOCAL UNION NO. 12

25-19 43rd Avenue
Long Island City, NY 11101
Phone: (718) 784-3456
Fax: (718) 784-8357
Joseph Lapinski, Bus. Agent
Nick Grgas, Bus. Agent
Matthew Aracick, Fin. Sec.
John Killard, President
Dennis Ippolito, Bus. Mgr.
matty@insulatorslocal12.com
dennis@insulators.org

HEAT FROST INSULATORS LOCAL UNION NO. 12A

2110 Newton Avenue
Astoria, NY 11102
Phone: (718) 937-3203
Fax: (718) 482-8722
Francisco Vega, Bus. Mgr.

IRON WORKERS DISTRICT

505 White Plains Road, Suite 200
Tarrytown, NY 10591
Phone: (914) 332-4430
Fax: (914) 332-4431
Edward J. Walsh, Pres.
ironworkdc@aol.com

IRON WORKERS NO. 40

451 Park Avenue South
New York, NY 10016
Phone: (212) 889-1320
Fax: (212) 779-3267
Robert Walsh, Bus. Mgr. Fin. Sec.
Daniel Doyle, Bus. Rep. V.P.
Kevin O'Rourke, Pres. Bus. Agent

IRON WORKERS NO. 361

89-19 97th Avenue
Ozone Park, NY 11416
Phone: (718) 332-1016-17
Fax: (718) 322-1053
Matthew Chartrand, Pres. Bus. Agent
Richard O'Kane, Bus. Mgr. Fin. Sec.
Thomas Seaman, President
Anthony DeBlaisie, Bus. Agent, V.P.
John Delaney, Jr., Rec. Sec.
unionhall@361.com

LABORERS LOCAL NO. 78 ASBESTOS & LEAD ABATEMENT

30 Cliff Street
New York, New York 10038-2825
Phone: (212) 227-4805
Fax: (212) 406-1800
Kazik Prosniewski, Pres.
Edison Severino, Bus. Mgr.
Pawel Gruchacz, Sec. Treas.
Local78dispatchers@gmail.com

LABORERS, CONSTRUCTION AND GENERAL BUILDING NO. 79

520 8th Avenue
New York, NY 10018
Phone: (212) 465-7900
Fax: (212) 465-7903
Kenneth Brancaccio, President
John Delgado, Bus. Mgr.
George Zecca, Bus. Mgr.
John Norbury, V.P. & Bus. Agent
Chas Rynkiewicz, Organizer, Mk Dev.
Eugene Sparano, Organizer Mkt. Dev.
John Modica, Bus. Agent
Joseph Cangelosi, Bus. Agent
Kenny Robinson, Bus. Agent
James Haggerty, Bus. Agent
Carl Tully, Bus. Agent
Jose Andino, Bus. Agent
Edward Medina, Bus. Agent

Luis Pereria, Bus Agent
Noe Duran, Bus. Agent
Timothy Campbell, Bus. Agent
John Wund, Agent, Organizer
79@laborerslocal.org

LABORERS NO. 731

34-11/19 35th Avenue
Astoria, NY 11106
(718) 706-0720
Joseph D'Amato, Bus. Mgr.

LATHERS METAL LOCAL NO. 46

1322 Third Avenue
New York, NY 10021
Phone: (212) 737-0500
Fax: (212) 249-1226
Robert Ledwith, Bus. Mgr.
Terence Moore, Bus. Agent
Kenneth Allen, Bus. Agent
Fred LeMoine Jr., Bus. Agent
Kevin Kelly, Bus. Agent

MASON TENDERS DIST. COUNCIL

520 8th Avenue
New York, NY 10018
Phone: (212) 452-9400
Fax: (212) 452-9499
Robert Bonanza, Bus. Mgr.
David Bolger, Field Rep.

METAL POLISHERS LOCAL UNION NO. 8A

36-18 33rd Street 2nd Fl.
Long Island City, 11106
Phone: (718) 361-1770
Fax: (718) 361-1934
Hector Lopez, Bus. Mgr., Pres.

METAL TRADES DIVISION

Kevin Connelly, Bus. Agent
21-42 44th Drive

MILLWRIGHT AND MACHINERY ERECTORS LOCAL NO. 740

89-07 Atlantic Avenue
Woodhaven, NY 11412
Phone: (718) 849-3636
Fax: (718) 849-0070
Robert Seeger, Bus. Mgr.

ORNAMENTAL IRON WORKERS NO. 580

501 West 42nd Street
New York, NY 10036
Phone: (212) 594-1662
Fax: (212) 564-2748
Dennis Lusardi, Bus. Mgr.
James Mahoney, Bus. Agent
Robert Benesh, Bus. Agent
Dennis Milton, Bus. Agent

Peter Creegan, Bus. Agent
dlusardi@local-580.com

PAINTERS DISTRICT COUNCIL NO. 9

45 West 14th Street
New York, NY 10011
Phone: (212) 255-2950
Fax: (212) 255-1151
William Elfeld, President
Gerard O'Brien, Bus. Rep.
Greg Coords, Bus. Rep.
Richard Small, Bus. Rep.
Jose Torent, Bus. Rep.
Raul Rendon, Bus. Rep.
Paul Belliveau, Bus. Rep.
Joseph Ramaglia, Bus. Mgr.
Anthony Buscema, Bus. Rep.
James Barnett, Bus. Rep.
Angelo Serse, Bus. Rep.
Jack Kittle, Political Dir.
Gus Diamantas, Training Director
John Barrett, Bus. Rep.

PAINTERS STRUCTURAL STEEL NO. 806

40 West 27th Street
New York, New York 10001
Phone: (212) 447-1838, 0149
Fax: (212) 545-8386
Angelo Serse, Bus. Mgr.

PAVERS & ROAD BUILDERS DISTRICT COUNCIL NO. 1

136-25 37th Avenue, Suite 502
Flushing, NY 11354
Phone: (718) 779-8850
Fax: (718) 779-8857
Keith Loscalzo, Bus. Mgr.
Vincent Masino, Trustee
Lowell Barton, Bus. Agent
Francisco Fernandez, Bus. Agent
Joao Teixeira, Bus. Agent
Bonaventura Valerio, Bus. Agent
Joseph Sarro, Bus. Agent

PLASTERS LOCAL UNION NO. 262

2241 Conner Street
Bronx, NY 10466
Phone: (718) 547-5440
Fax: (718) 547-5435
John Sweeney, Int'l Rep.
mventura@opcmllocal262.com

PLUMBERS NO. 1

158-29 Bross Bay Boulevard
Howard Beach, NY 11414
Phone: (718) 738-7500
Fax: (718) 835-0896
George Reilly, Bus. Mgr.
Daniel Lucarelli, Bus. Agent
PLA-Union Contact List_rev

Kevin Brady Sr., Bus. Agent
Donald Doherty Jr. Bus. Agent at Large
Dudley Kinsley, Bus. Agent
Michael Apuzzo, Bus. Agent
John Feeney Jr., Bus. Agent
Paul O'conner, Bus. Agent
Anthony Russini, Bus. Agent
John Murphy, Fin. Sec. Treasurer
Fred Delligatti, Bus. Agent
Thomas Kemps, Bus. Agent
plunyny@aol.com

PRIVATE SANITATION LOCAL NO. 813

45-18 Court Sq., Suite 600
Long Island City, NY 11101
Phone: (718) 937-7010
Fax: (718) 937-7003
Anthony Marino, President

ROOFERS & WATERPROOFERS NO. 8

467 Dean Street
Brooklyn, NY 11217
Phone: (718) 857-3500
Fax (718) 398-8359
Thomas Pedrick, Trustee & Int'l V.P.
Nicolas Siciliano, Bus. Agent

SHEET METAL WORKERS LOCAL NO. 28

MANHATTAN OFFICE
500 Greenwich Street
New York, NY 10013
Phone: (212) 226-941-7700
Fax: (212) 226-0304
Brian McBreaty, Bus. Agent
Richard Knice, Fin. Sec.-Treas.
Michael Belluzzi, Bus. Mgr. & Pres.
Kevin McPike, Bus. Agent
Daniel Fox Jr., Bus. Agent
Rick Buckheit, Bus. Agent
Robert Rotolo, Bus. Mgr.
joanne@local28union.com

SHEET METAL WORKERS LOCAL 137

21-42 44th Drive
Long Island City, NY 11101
Phone: (718) 937-4514
Fax: (718) 937-4113
Paul Collins Jr.
Dante Dano, Agent

STEAMFITTERS LOCAL UNION NO. 638

32-32 48th Avenue
Long Island City, NY 11101
Phone: (718) 392-3420
Fax: (718) 784-7285
John Torpey, Pres.-Fax: (718) 372-5340
James Elder, Sec. Treasurer
John Enright, Bus. Agent

John O'Connell, Bus. Agent
Richard Roberts, Bus. Agent At-Large
Patrick Dolan Jr., Bus. Agent
Brian Wangerman, Bus. Agent
Robert Egan Jr., Bus. Agent
Vincent Curran Jr., Bus. Agent
Patrick Daly, Bus. Agent
Raymond Dean Jr., Bus. Agent
Scott Roche, Bus. Agent
Patrick Norton, Bus. Agent
Robert Bartels, Jr. Bus. Agent
Christopher P. Sheeran, Bus. Agent
bpetriccione@steamfitters638.org
rroberts@steamfitters638.org

TEAMSTERS LOCAL UNION 282

2500 Marcus Avenue
Lake Success, NY 11042
Phone: (516) 488-2822
Fax: (516) 488-4895
Thomas Gesualdi
Kpalmeri282@yahoo.com

TEAMSTERS LOCAL UNION 814

33-01 38TH Avenue
Long Island City, NY 11101
Phone: (718) 392-4510
Fax: (718) 361-9610
George Daniello, Pres., Bus. Mgr.
team814@hotmail.com

TILE, MARBLE & TERRAZO B.A.C. LOCAL UNION 7

45-34 Court Square
Long Island City, NY 11101
Phone: (718) 786-7648
Fax: (718) 472-2370
Thomas Lane, President Bus. Mgr.
William Hill, Bus. Agent
Blaise Toneatto, Bus. Agent
Christopher Guy, Sec. Treasuer
Ernesto Jimenez, Bus. Agent
Joseph Andriano, Bus. Agent
Ronald Nicastri, Bus. Agent
James Ghan, Bus. Agent
tlane@baclocal7.com

TIMBERMEN LOCAL 1536

395 Hudson Street, 8th Floor
New York, NY 10014
Phone: (212) 366-7500
Samuel Bailey, Bus. Mgr.

NYC AGENCY RENOVATION & REHAB OF CITY OWNED BUILDINGS/STRUCTURES

PROJECT LABOR AGREEMENT

COVERING SPECIFIED

**RENOVATION & REHABILITATION
OF CITY OWNED BUILDINGS AND STRUCTURES**



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**PROJECT LABOR AGREEMENT COVERING SPECIFIED
RENOVATION & REHABILITATION OF NEW YORK CITY OWNED
FACILITIES & STRUCTURES**

ARTICLE 1 - PREAMBLE

WHEREAS, the City of New York desires to provide for the cost efficient, safe, quality, and timely completion of certain rehabilitation and renovation work ("Program Work," as defined in Article 3) for Fiscal Years 2010 - 2014 in a manner designed to afford the lowest costs to the Agencies covered by this Agreement, and the Public it represents, and the advancement of permissible statutory objectives;

WHEREAS, this Project Labor Agreement will foster the achievement of these goals, inter alia, by:

(1) providing a mechanism for responding to the unique construction needs associated with this Program Work and achieving the most cost effective means of construction, including direct labor cost savings, by the Building and Construction Trades Council of Greater New York and Vicinity and the signatory Local Unions and their members waiving various shift and other hourly premiums and other work and pay practices which would otherwise apply to Program Work;

(2) expediting the construction process and otherwise minimizing the disruption to the covered Agencies' ongoing operations at the facilities that are the subject of the Agreement;

(3) avoiding the costly delays of potential strikes, slowdowns, walkouts, picketing and other disruptions arising from work disputes, reducing jobsite friction on common situs worksites, and promoting labor harmony and peace for the duration of the Program Work;

(4) standardizing the terms and conditions governing the employment of labor on the Program Work;

(5) permitting wide flexibility in work scheduling and shift hours and times to allow maximum work to be done during off hours yet at affordable pay rates;

(6) permitting adjustments to work rules and staffing requirements from those which otherwise might obtain;

(7) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

- (8) ensuring a reliable source of skilled and experienced labor; and
- (9) securing applicable New York State Labor Law exemptions.

WHEREAS, the Building and Construction Trades Council of Greater New York and Vicinity, its participating affiliated Local Unions and their members, desire to assist the City in meeting these operational needs and objectives as well as to provide for stability, security and work opportunities which are afforded by this Project Labor Agreement; and

WHEREAS, the Parties desire to maximize Program Work safety conditions for both workers and the community in the project area.

NOW, THEREFORE, the Parties enter into this Agreement:

SECTION 1. PARTIES TO THE AGREEMENT

This is a Project Labor Agreement ("Agreement") entered into by the City of New York, on behalf of itself and the Agencies covered herein, including in their capacity as construction manager of covered projects and/or on behalf of any third party construction manager which may be utilized, and the Building and Construction Trades Council of Greater New York and Vicinity ("Council") (on behalf of itself) and the signatory affiliated Local Union's ("Unions" or "Local Unions"). The Council and each signatory Local Union hereby warrants and represents that it has been duly authorized to enter into this Agreement.

ARTICLE 2 - GENERAL CONDITIONS

SECTION 1. DEFINITIONS

Throughout this Agreement, the various Union parties including the Building and Construction Trades Council of Greater New York and Vicinity and its participating affiliated Local Unions, are referred to singularly and collectively as "Union(s)" or "Local Unions"; the term "Contractor(s)" shall include any Construction Manager, General Contractor and all other

contractors, and subcontractors of all tiers engaged in Program Work within the scope of this Agreement as defined in Article 3; "Agency" means the following New York City agencies: the Department for the Aging (DFTA), Administration for Children's Services (ACS), Department of Citywide Administrative Services (DCAS), Department of Corrections (DOC), Department of Design and Construction (DDC), Fire Department (FDNY), Department of Homeless Services (DHS), Human Resources Administration (HRA), Department of Health and Mental Hygiene (DOHMH), Department of Parks and Recreation (DPR), Police Department (NYPD); Department of Sanitation (DSNY); the New York City Agency that awards a particular contract subject to this Agreement may be referred to hereafter as the "Agency"; when an Agency acts as Construction Manager, unless otherwise provided, it has the rights and obligations of a "Construction Manager" in addition to the rights and obligations of an Agency; the Building and Construction Trades Council of Greater New York and Vicinity is referred to as the "Council"; and the work covered by this Agreement (as defined in Article 3) is referred to as "Program Work."

SECTION 2. CONDITIONS FOR AGREEMENT TO BECOME EFFECTIVE

This Agreement shall not become effective unless each of the following conditions are met: the Agreement is executed by (1) the Council, on behalf of itself, (2) the participating affiliated Local Unions; and (3) the mayor of the City of New York or his designee.

SECTION 3. ENTITIES BOUND & ADMINISTRATION OF AGREEMENT

This Agreement shall be binding on all participating Unions and their affiliates, the Construction Manager (in its capacity as such) and all Contractors of all tiers performing Program Work, as defined in Article 3. The Contractors shall include in any subcontract that they let for performance during the term of this Agreement a requirement that their subcontractors, of all tiers, become signatory and bound by this Agreement with respect to that subcontracted work

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

falling within the scope of Article 3 and all Contractors (including subcontractors) performing Program Work shall be required to sign a "Letter of Assent" in the form annexed hereto as Exhibit "A". This Agreement shall be administered by the applicable Agency or a Construction Manager or such other designee as may be named by the Agency or Construction Manager, on behalf of all Contractors.

SECTION 4. SUPREMACY CLAUSE

This Agreement, together with the local Collective Bargaining Agreements appended hereto as Schedule A, represents the complete understanding of all signatories and supersedes any national agreement, local agreement or other collective bargaining agreement of any type which would otherwise apply to this Program Work, in whole or in part, except that Program Work which falls within the jurisdiction of the Operating Engineers Locals 14 and 15 and/or the Teamsters Local 282 will be performed under the terms and conditions set out in the Schedule A agreements of Operating Engineers Locals 14 and 15 and Teamsters Local 282. Subject to the foregoing, where a subject covered by the provisions of this Agreement is also covered by a Schedule A, the provisions of this Agreement shall prevail. It is further understood that no Contractor shall be required to sign any other agreement as a condition of performing Program Work. No practice, understanding or agreement between a Contractor and a Local Union which is not set forth in this Agreement shall be binding on this Program Work unless endorsed in writing by the Construction Manager or such other designee as may be designated by the Agency.

SECTION 5. LIABILITY

The liability of any Contractor and the liability of any Union under this Agreement shall be several and not joint. The Construction Manager and any Contractor shall not be liable for any violations of this Agreement by any other Contractor; and the Council and

Local Unions shall not be liable for any violations of this Agreement by any other Union.

SECTION 6. THE AGENCY

The Agency (or Construction Manager where applicable) shall require in its bid specifications for all Program Work within the scope of Article 3 that all successful bidders, and their subcontractors of all tiers, become bound by, and signatory to, this Agreement. The Agency (or Construction Manager) shall not be liable for any violation of this Agreement by any Contractor. It is understood that nothing in this Agreement shall be construed as limiting the sole discretion of the Agency or Construction Manager in determining which Contractors shall be awarded contracts for Program Work. It is further understood that the Agency or Construction Manager has sole discretion at any time to terminate, delay or suspend the Program Work, in whole or part, on any Program.

SECTION 7. AVAILABILITY AND APPLICABILITY TO ALL SUCCESSFUL BIDDERS

The Unions agree that this Agreement will be made available to, and will fully apply to, any successful bidder for (or subcontractor of) Program Work who becomes signatory thereto, without regard to whether that successful bidder (or subcontractor) performs work at other sites on either a union or non-union basis and without regard to whether employees of such successful bidder (or subcontractor) are, or are not, members of any unions. This Agreement shall not apply to the work of any Contractor which is performed at any location other than the site of Program Work.

SECTION 8. SUBCONTRACTING

Contractors will subcontract Program Work only to a person, firm or corporation who is or agrees to become party to this Agreement.

ARTICLE 3-SCOPE OF THE AGREEMENT

SECTION 1. WORK COVERED

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

Program Work shall be limited to designated rehabilitation and renovation construction contracts bid and let by an Agency (or its Construction Manager where applicable) after the effective date of this Agreement with respect to rehabilitation and renovation work performed for an Agency on City-owned property under contracts let prior to June 30, 2014. Subject to the foregoing, and the exclusions below, such Program Work shall mean any and all contracts that predominantly involve the renovation, repair, alteration, rehabilitation or expansion of an existing City-owned building or structure within the five boroughs of New York City. Examples of Program Work include, but are not limited to, the renovation, repair, alteration and rehabilitation of an existing temporary or permanent structure, or an expansion of above ground structures located in the City on a City-owned building. This Program Work shall also include JOCS contracts, demolition work, site work, asbestos and lead abatement, painting services, carpentry services, and carpet removal and installation, to the extent incidental to such building rehabilitation of City-owned buildings or structures.

It is understood that Program Work does not include, and this Project Labor Agreement shall not apply to, any other work, including:

1. Contracts let and work performed in connection with projects carried over, recycled from, or performed under bids or rebids relating to work that were bid prior to the effective date of this Agreement or after June 30, 2014;
2. Contracts procured on an emergency basis;
3. Small purchases (purchases not more than \$100,000) awarded pursuant to New York City Charter §314, New York City Charter § 316 and New York City Procurement Policy Board Rules §3-08;
4. Contracts for work on streets and bridges and for the closing or environmental remediation of landfills;

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

5. Contracts with not-for-profit corporations where the City is not awarding or performing the work performed for that entity;

6. Contracts with governmental entities where the City is not awarding or performing the work performed for that entity;

7. Contracts with electric utilities, gas utilities, telephone companies, and railroads, except that it is understood and agreed that these entities may only install their work to a demarcation point, e.g. a telephone closet or utility vault, the location of which is determined prior to construction and employees of such entities shall not be used to replace employees performing Program Work pursuant to this agreement; and

8. Contracts for installation of information technology that are not otherwise Program Work.

SECTION 2. TIME LIMITATIONS

In addition to falling within the scope of Article 3, Section 1, to be covered by this Agreement Program Work must be (1) advertised and let for bid after the effective date of this Agreement, and (2) let for bid prior to June 30, 2014, the expiration date of this Agreement. It is understood that this Agreement, together with all of its provisions, shall remain in effect for all such Program Work until completion, even if not completed by the expiration date of the Agreement. If Program Work otherwise falling within the scope of Article 3, Section 1 is not let for bid by the expiration date of this Agreement, this Agreement may be extended to that work by mutual agreement of the parties.

SECTION 3. EXCLUDED EMPLOYEES

The following persons are not subject to the provisions of this Agreement, even though performing Program Work:

A. Superintendents, supervisors (excluding general and forepersons

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

specifically covered by a craft's Schedule A), engineers, professional engineers and/or licensed architects engaged in inspection and testing, quality control/assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers, guards, technicians, non-manual employees, and all professional, engineering, administrative and management persons;

B.. Employees of the Agency, New York City, or any other municipal or State agency, authority or entity, or employees of any other public employer, even though working on the Program site while covered Program Work is underway;

C. Employees and entities engaged in off-site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of project components, materials, equipment or machinery or involved in deliveries to and from the Program site, except to the extent they are lawfully included in the bargaining unit of a Schedule A agreement;

D. Employees of the Construction Manager (except that in the event the Agency engages a Contractor to serve as Construction Manager, then those employees of the Construction Manager performing manual, on site construction labor will be covered by this Agreement);

E. Employees engaged in on-site equipment warranty work unless employees are already working on the site and are certified to perform warranty work;

F. Employees engaged in geophysical testing other than boring for core samples;

G. Employees engaged in laboratory, specialty testing, or inspections, pursuant to a professional services agreement between the Agency, or any of the Agency's other professional consultants, and such laboratory, testing, inspection or surveying firm; and

H. Employees engaged in on-site maintenance of installed equipment or systems which maintenance is awarded as part of a contract that includes Program Work but

which maintenance occurs after installation of such equipment or system and is not directly related to construction services.

SECTION 4. NON-APPLICATION TO CERTAIN ENTITIES

This Agreement shall not apply to those parents, affiliates, subsidiaries, or other joint or sole ventures of any Contractor which do not perform Program Work. It is agreed that this Agreement does not have the effect of creating any joint employment, single employer or alter ego status among the Agency (including in its capacity as Construction Manager) or any Contractor. The Agreement shall further not apply to any New York City or other municipal or State agency, authority, or entity other than a listed Agency and nothing contained herein shall be construed to prohibit or restrict the Agency or its employees, or any State, New York City or other municipal or State authority, agency or entity and its employees, from performing on or off-site work related to Program Work.

As the contracts involving Program Work are completed and accepted, the Agreement shall not have further force or effect on such items or areas except where inspections, additions, repairs, modifications, check-out and/or warranty work are assigned in writing (copy to Local Union involved) by the Agency (or Construction Manager) for performance under the terms of this Agreement.

ARTICLE 4- UNION RECOGNITION AND EMPLOYMENT

SECTION 1. PRE-HIRE RECOGNITION

The Contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all employees who are performing on-site Program Work, with respect to that work.

SECTION 2. UNION REFERRAL

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

A. The Contractors agree to employ and hire craft employees for Program Work covered by this Agreement through the job referral systems and hiring halls established in the Local Unions' area collective bargaining agreements. Notwithstanding this, Contractors shall have sole right to determine the competency of all referrals; to determine the number of employees required; to select employees for layoff (subject to Article 5, Section 3); and the sole right to reject any applicant referred by a Local Union, subject to the show-up payments. In the event that a Local Union is unable to fill any request for qualified employees within a 48 hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source. In the event that the Local Union does not have a job referral system, the Contractor shall give the Local Union first preference to refer applicants, subject to the other provisions of this Article. The Contractor shall notify the Local Union of craft employees hired for Program Work within its jurisdiction from any source other than referral by the Union.

B. A Contractor may request by name, and the Local will honor, referral of persons who have applied to the Local for Program Work and who meet the following qualifications:

- (1) possess any license required by New York State law for the Program Work to be performed;
- (2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and
- (3) were on the Contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award.

No more than twelve per centum (12%) of the employees covered by this Agreement, per Contractor by craft, shall be hired through the special provisions above. Under this provision, name referrals begin with the eighth employee needed and continue on that same

basis.

C. Notwithstanding Section 2(B), above, certified MWBE contractors for which participation goals are set pursuant to New York City Administrative Code §6-129, that are not signatory to any Schedule A CBAs, with contracts valued at or under five hundred thousand (\$500,000), may request by name, and the Local will honor, referral of the second (2nd), fourth (4th), sixth (6th), and eighth (8th) employee, who have applied to the Local for Program Work and who meet the following qualifications:

- (1) possess any license required by New York State law for the Program Work to be performed;
- (2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and
- (3) were on the Contractor's active payroll for at least 60 out of the 180 work days prior to the contract award.

For such contracts valued at above \$500,000 but less than \$1 million, the Local will honor referrals by name of the second (2nd), fifth (5th), and eighth (8th) employee subject to the foregoing requirements. In both cases, name referrals will thereafter be in accordance with Section 2(B), above.

D. Where a certified MWBE Contractor voluntarily enters into a Collective Bargaining Agreement ("CBA") with a BCTC Union, the employees of such Contractor at the time the CBA is executed shall be allowed to join the Union for the applicable trade subject to satisfying the Union's basic standards of proficiency for admission.

SECTION 3. NON-DISCRIMINATION IN REFERRALS

The Council represents that each Local Union hiring hall and referral system will be operated in a non-discriminatory manner and in full compliance with all applicable federal, state and local laws and regulations which require equal employment opportunities. Referrals

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements and shall be subject to such other conditions as are established in this Article. No employment applicant shall be discriminated against by any referral system or hiring hall because of the applicant's union membership, or lack thereof.

SECTION 4: MINORITY AND FEMALE REFERRALS

In the event a Local Union either fails, or is unable to refer qualified minority or female applicants in percentages equaling the workforce participation goals adopted by the City and set forth in the Agency's (or, if applicable, Construction Manager's) bid specifications, within 48 hours of the request for same, the Contractor may employ qualified minority or female applicants from any other available source.

SECTION 5. CROSS AND QUALIFIED REFERRALS

The Local Unions shall not knowingly refer to a Contractor an employee then employed by another Contractor working under this Agreement. The Local Unions will exert their utmost efforts to recruit sufficient numbers of skilled and qualified crafts employees to fulfill the requirements of the Contractor.

SECTION 6. UNION DUES

All employees covered by this Agreement shall be subject to the union security provisions contained in the applicable Schedule A local agreements, as amended from time to time, but only for the period of time during which they are performing on-site Program Work and only to the extent of tendering payment of the applicable union dues and assessments uniformly required for union membership in the Local Unions which represent the craft in which the employee is performing Program Work. No employee shall be discriminated against at any Program Work site because of the employee's union membership or lack thereof. In the case of

unaffiliated employees, the dues payment will be received by the Local Unions as an agency shop fee.

SECTION 7. CRAFT FOREPERSONS AND GENERAL FOREPERSONS

The selection of craft forepersons and/or general forepersons and the number of forepersons required shall be solely the responsibility of the Contractor except where otherwise provided by specific provisions of an applicable Schedule A, and provided that all craft forepersons shall be experienced and qualified journeypersons in their trade as determined by the appropriate Local Union. All forepersons shall take orders exclusively from the designated Contractor representatives. Craft forepersons shall be designated as working forepersons at the request of the Contractor, except when an existing local Collective Bargaining Agreement prohibits a foreperson from working when the craft persons he is leading exceed a specified number.

ARTICLE 5- UNION REPRESENTATION

SECTION 1. LOCAL UNION REPRESENTATIVE

Each Local Union representing on-site employees shall be entitled to designate in writing (copy to Contractor involved and Construction Manager) one representative, and/or the Business Manager, who shall be afforded access to the Program Work site.

SECTION 2. STEWARDS

A. Each Local Union shall have the right to designate a working journey person as a Steward and an alternate, and shall notify the Contractor and Construction Manager of the identity of the designated Steward (and alternate) prior to the assumption of such duties. Stewards shall not exercise supervisory functions and will receive the regular rate of pay for their craft classifications. All Stewards shall be working Stewards.

B. In addition to their work as an employee, the Steward shall have the right

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

to receive complaints or grievances and to discuss and assist in their adjustment with the Contractor's appropriate supervisor. Each Steward shall be concerned with the employees of the Steward's trade and, if applicable, subcontractors of their Contractor, but not with the employees of any other trade Contractor. No Contractor shall discriminate against the Steward in the proper performance of Union duties.

C. The Stewards shall not have the right to determine when overtime shall be worked, or who shall work overtime except pursuant to a Schedule A provision providing procedures for the equitable distribution of overtime.

SECTION 3. LAYOFF OF A STEWARD

Contractors agree to notify the appropriate Union 24 hours prior to the layoff of a Steward, except in cases of discipline or discharge for just cause. If a Steward is protected against layoff by a Schedule A provision, such provision shall be recognized to the extent the Steward possesses the necessary qualifications to perform the work required. In any case in which a Steward is discharged or disciplined for just cause, the Local Union involved shall be notified immediately by the Contractor.

ARTICLE 6- MANAGEMENT'S RIGHTS

SECTION 1. RESERVATION OF RIGHTS

Except as expressly limited by a specific provision of this Agreement, Contractors retain full and exclusive authority for the management of their operations including, but not limited to, the right to: direct the work force, including determination as to the number of employees to be hired and the qualifications therefore; the promotion, transfer, layoff of its employees; require compliance with the directives of the Agency including standard restrictions related to security and access to the site that are equally applicable to Agency employees, guests,

or vendors; or the discipline or discharge for just cause of its employees; assign and schedule work; promulgate reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work; and, the requirement, timing and number of employees to be utilized for overtime work. No rules, customs, or practices which limit or restrict productivity or efficiency of the individual, as determined by the Contractor, Agency and/or Construction Manager and/or joint working efforts with other employees shall be permitted or observed.

SECTION 2. MATERIALS, METHODS & EQUIPMENT

There shall be no limitation or restriction upon the Contractors' choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices. Contractors may, without restriction, install or use materials, supplies or equipment regardless of their source; provided, however, that where there is a Schedule "A" that includes a lawful union standards and practices clauses, then such clause as set forth in Schedule A Agreements will be complied with, unless there is a lawful Agency specification (or specification issued by a Construction Manager which would be lawful if issued by the Agency directly) that would specifically limit or restrict the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices, and which would prevent compliance with such Schedule A clause. The on-site installation or application of such items shall be performed by the craft having jurisdiction over such work; provided, however, it is recognized that other personnel having special qualifications may participate, in a supervisory capacity, in

the installation, check-off or testing of specialized or unusual equipment or facilities as designated by the Contractor. There shall be no restrictions as to work which is performed off-site for Program Work.

ARTICLE 7- WORK STOPPAGES AND LOCKOUTS

SECTION 1. NO STRIKES-NO LOCK OUT

There shall be no strikes, sympathy strikes, picketing, work stoppages, slowdowns, hand billing, demonstrations or other disruptive activity at the Program Work site for any reason by any Union or employee against any Contractor or employer. There shall be no other Union, or concerted or employee activity which disrupts or interferes with the operation of the Program Work or the objectives of the Agency at any Program Work site. In addition, failure of any Union or employee to cross any picket line established by any Union, signatory or non-signatory to this Agreement, or the picket or demonstration line of any other organization, at or in proximity to a Program Work site where the failure to cross disrupts or interferes with the operation of Program Work is a violation of this Article. Should any employees breach this provision, the Unions will use their best efforts to try to immediately end that breach and return all employees to work. There shall be no lockout at a Program Work site by any signatory Contractor, Agency or Construction Manager.

SECTION 2. DISCHARGE FOR VIOLATION

A Contractor may discharge any employee violating Section 1, above, and any such employee will not be eligible thereafter for referral under this Agreement for a period of 100 days.

SECTION 3. NOTIFICATION

If a Contractor contends that any Union has violated this Article, it will notify the

Local Union involved advising of such fact, with copies of the notification to the Council. The Local Union shall instruct and order, the Council shall request, and each shall otherwise use their best efforts to cause, the employees (and where necessary the Council shall use its best efforts to cause the Local Union), to immediately cease and desist from any violation of this Article. If the Council complies with these obligations it shall not be liable for the unauthorized acts of a Local Union or its members. Similarly, a Local Union and its members will not be liable for any unauthorized acts of the Council. Failure of a Contractor or the Construction Manager to give any notification set forth in this Article shall not excuse any violation of Section 1 of this Article.

SECTION 4. EXPEDITED ARBITRATION

Any Contractor or Union alleging a violation of Section 1 of this Article may utilize the expedited procedure set forth below (in lieu of, or in addition to, any actions at law or equity) that may be brought.

A. A party invoking this procedure shall notify J.J. Pierson or Richard Adelman; who shall alternate (beginning with Arbitrator J.J. Pierson) as Arbitrator under this expedited arbitration procedure. If the Arbitrator next on the list is not available to hear the matter within 24 hours of notice, the next Arbitrator on the list shall be called. Copies of such notification will be simultaneously sent to the alleged violator and Council.

B. The Arbitrator shall thereupon, after notice as to time and place to the Contractor, the Local Union involved, the Council and the Construction Manager, hold a hearing within 48 hours of receipt of the notice invoking the procedure if it is contended that the violation still exists. The hearing will not, however, be scheduled for less than 24 hours after the notice required by Section 3, above.

C. All notices pursuant to this Article may be provided by telephone, telegraph, hand delivery, or fax, confirmed by overnight delivery, to the Arbitrator, Contractor,

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Construction Manager and Local Union involved. The hearing may be held on any day including Saturdays or Sundays. The hearing shall be completed in one session, which shall not exceed 8 hours duration (no more than 4 hours being allowed to either side to present their case, and conduct their cross examination) unless otherwise agreed. A failure of any Union or Contractor to attend the hearing shall not delay the hearing of evidence by those present or the issuance of an award by the Arbitrator.

D. The sole issue at the hearing shall be whether a violation of Section 1, above, occurred. If a violation is found to have occurred, the Arbitrator shall issue a Cease and Desist Award restraining such violation and serve copies on the Contractor and Union involved. The Arbitrator shall have no authority to consider any matter in justification, explanation or mitigation of such violation or to award damages (any damages issue is reserved solely for court proceedings, if any.) The Award shall be issued in writing within 3 hours after the close of the hearing, and may be issued without an Opinion. If any involved party desires an Opinion, one shall be issued within 15 calendar days, but its issuance shall not delay compliance with, or enforcement of, the Award.

E. The Agency and Construction Manager (or such other designee of the Agency) may participate in full in all proceedings under this Article.

F. An Award issued under this procedure may be enforced by any court of competent jurisdiction upon the filing of this Agreement together with the Award. Notice of the filing of such enforcement proceedings shall be given to the Union or Contractor involved, and the Construction Manager.

G. Any rights created by statute or law governing arbitration proceedings which are inconsistent with the procedure set forth in this Article, or which interfere with compliance thereto, are hereby waived by the Contractors and Unions to whom they accrue.

H. The fees and expenses of the Arbitrator shall be equally divided between the involved Contractor and Union.

SECTION 5. ARBITRATION OF DISCHARGES FOR VIOLATION

Procedures contained in Article 9 shall not be applicable to any alleged violation of this Article, with the single exception that an employee discharged for violation of Section 1, above, may have recourse to the procedures of Article 9 to determine only if the employee did, in fact, violate the provisions of Section 1 of this Article; but not for the purpose of modifying the discipline imposed where a violation is found to have occurred.

ARTICLE 8 - LABOR MANAGEMENT COMMITTEE

SECTION 1. SUBJECTS

The Program Labor Management Committee will meet on a regular basis to: 1) promote harmonious relations among the Contractors and Unions; 2) enhance safety awareness, cost effectiveness and productivity of construction operations; 3) protect the public interests; 4) discuss matters relating to staffing and scheduling with safety and productivity as considerations; and 5) review efforts to meet applicable participation goals for MWBEs and workforce participation goals for minority and female employees.

SECTION 2. COMPOSITION

The Committee shall be jointly chaired by a designee of the Agency and the President of the Council. It may include representatives of the Local Unions and Contractors involved in the issues being discussed. The parties may mutually designate an MWBE representative to participate in appropriate Committee discussions. The Committee may conduct business through mutually agreed upon sub-committees.

ARTICLE 9- GRIEVANCE & ARBITRATION PROCEDURE

SECTION 1. PROCEDURE FOR RESOLUTION OF GRIEVANCES

Any question, dispute or claim arising out of, or involving the interpretation or application of this Agreement (other than jurisdictional disputes or alleged violations of Article 7, Section 1) shall be considered a grievance and shall be resolved pursuant to the exclusive procedure of the steps described below, provided, in all cases, that the question, dispute or claim arose during the term of this Agreement.

Step 1:

(a) When any employee covered by this Agreement feels aggrieved by a claimed violation of this Agreement, the employee shall, through the Local Union business representative or job steward give notice of the claimed violation to the work site representative of the involved Contractor and the Construction Manager. To be timely, such notice of the grievance must be given within 7 calendar days after the act, occurrence or event giving rise to the grievance. The business representative of the Local Union or the job steward and the work site representative of the involved Contractor shall meet and endeavor to adjust the matter within 7 calendar days after timely notice has been given. If they fail to resolve the matter within the prescribed period, the grieving party, may, within 7 calendar days thereafter, pursue Step 2 of the grievance procedure by serving the involved Contractor with written copies of the grievance setting forth a description of the claimed violation, the date on which the grievance occurred, and the provisions of the Agreement alleged to have been violated. Grievances and disputes settled at Step 1 are non-precedential except as to the specific Local Union, employee and Contractor directly involved unless the settlement is accepted in writing by the Construction Manager (or designee) as creating a precedent.

(b) Should any signatory to this Agreement have a dispute (excepting jurisdictional disputes or alleged violations of Article 7, Section 1) with any other signatory to

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this Agreement and, if after conferring, a settlement is not reached within 7 calendar days, the dispute shall be reduced to writing and proceed to Step 2 in the same manner as outlined in subparagraph (a) for the adjustment of employee grievances.

Step 2:

The Business Manager or designee of the involved Local Union, together with representatives of the involved Contractor, Council and the Construction Manager (or designee), shall meet in Step 2 within 7 calendar days of service of the written grievance to arrive at a satisfactory settlement.

Step 3:

(a) If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 21 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants, including the Construction Manager or designee) to J.J. Pierson or Richard Adelman, who shall act, alternately (beginning with Arbitrator J.J. Pierson), as the Arbitrator under this procedure. The Labor Arbitration Rules of the American Arbitration Association shall govern the conduct of the arbitration hearing, at which all Step 2 participants shall be parties. The decision of the Arbitrator shall be final and binding on the involved Contractor, Local Union and employees and the fees and expenses of such arbitrations shall be borne equally by the involved Contractor and Local Union.

(b) Failure of the grieving party to adhere to the time limits set forth in this Article shall render the grievance null and void. These time limits may be extended only by written consent of the Construction Manager (or designee), involved Contractor and involved Local Union at the particular step where the extension is agreed upon. The Arbitrator shall have authority to make decisions only on the issues presented to him and shall not have the authority to change, add to, delete or modify any provision of this Agreement.

SECTION 2. LIMITATION AS TO RETROACTIVITY

No arbitration decision or award may provide retroactivity of any kind exceeding 60 calendar days prior to the date of service of the written grievance on the Construction Manager and the involved Contractor or Local Union.

SECTION 3. PARTICIPATION BY AGENCY AND/OR CONSTRUCTION MANAGER

The Agency and Construction Manager (or such other designee of the Agency) shall be notified by the involved Contractor of all actions at Steps 2 and 3 and, at its election, may participate in full in all proceedings at these Steps, including Step 3 arbitration.

ARTICLE 10 - JURISDICTIONAL DISPUTES

SECTION 1. NO DISRUPTIONS

There will be no strikes, sympathy strikes, work stoppages, slowdowns, picketing or other disruptive activity of any kind arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted and as assigned by the Contractor. No jurisdictional dispute shall excuse a violation of Article 7.

SECTION 2. ASSIGNMENT

All Program Work assignments shall be made by the Contractor to unions affiliated with the BCTC consistent with the New York Plan for the Settlement of Jurisdictional Disputes ("New York Plan") and its Greenbook decisions, if any. Where there are no applicable Greenbook decisions, assignments shall be made in accordance with the provisions of the New York Plan and local industry practice.

SECTION 3. NO INTERFERENCE WITH WORK

There shall be no interference or interruption of any kind with the Program Work while any jurisdictional dispute is being resolved. The work shall proceed as assigned by the

Contractor until finally resolved under the applicable procedure of this Article. The award shall be confirmed in writing to the involved parties. There shall be no strike, work stoppage or interruption in protest of any such award.

ARTICLE 11 - WAGES AND BENEFITS

SECTION 1. CLASSIFICATION AND BASE HOURLY RATE

All employees covered by this Agreement shall be classified in accordance with the work performed and paid the hourly wage rates applicable for those classifications as required by the applicable prevailing wage laws.

SECTION 2. EMPLOYEE BENEFITS

A. The Contractors agree to pay on a timely basis contributions on behalf of all employees covered by this Agreement to those established jointly trustee employee benefit funds designated in Schedule A (in the appropriate Schedule A amounts), provided that such benefits are required to be paid on public works under any applicable prevailing wage law. Bona fide jointly trustee fringe benefit plans established or negotiated through collective bargaining during the life of this Agreement may be added if similarly required under applicable prevailing wage law. Contractors, not otherwise contractually bound to do so, shall not be required to contribute to benefits, trusts or plans of any kind which are not required by the prevailing wage law provided, however, that this provision does not relieve Contractors signatory to local collective bargaining agreement with any affiliated union from complying with the fringe benefit requirements for all funds contained in the CBA.

B. The Contractors agree to be bound by the written terms of the legally established jointly trustee Trust Agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of, such Trust Funds but only with regard to Program Work done under this Agreement and only for those employees to whom this Agreement

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requires such benefit payments.

C. To the extent consistent with New York City's Procurement Policy Board Rules with respect to prompt payment, as published at www.nyc.gov/ppb, §4-06(e), and in consideration of the unions' waiver of their rights to withhold labor from a contractor or subcontractor delinquent in the payment of fringe benefits contributions ("Delinquent Contractor"); the Agency agrees that where any such union and/or fringe benefit fund shall notify the Agency, the General Contractor, and the Delinquent Contractor in writing with back-up documentation that the Delinquent Contractor has failed to make fringe benefit contributions to it as provided herein and the Delinquent Contractor shall fail, within ten (10) calendar days after receipt of such notice, to furnish either proof of such payment or notice that the amount claimed by the union and/or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor which the union or fringe benefit fund claims to be due it, and shall remit the amount when and so withheld to the fringe benefit fund and deduct such payment from the amounts then otherwise due and payable to the General Contractor, which payment shall, as between the General Contractor and the Agency, be deemed a payment by the Agency to the General Contractor; provided however, that in any month, such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. The union or its employee benefit funds shall include in its notification of delinquent payment of fringe benefits only such amount it asserts the Delinquent Contractor failed to pay on the specific project against which the claim is made and the union or its employee benefit funds may not include in such notification any amount such Delinquent Contractor may have failed to pay on any other City or non-City project.

D. In the event the General Contractor or Delinquent Contractor shall notify the Agency as above provided that the claim of the union or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor which the union and/or fringe benefit fund claims to be due it, and deposit such amount when and so withheld in a separate interest-bearing account pending resolution of the dispute pursuant to the union's Schedule A agreement, and the amount so deposited together with the interest thereon shall be paid to the party or parties ultimately determined to be entitled thereto, or held until the Delinquent Contractor and union or fringe benefit fund shall otherwise agree as to the disposition thereof; provided however, that such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. In the event the Agency shall be required to withhold amounts from a General Contractor for the benefit of more than one fringe benefit fund, the amounts so withheld in the manner and amount prescribed above shall be applied to or for such fund in the order in which the written notices of nonpayment have been received by the Agency, and if more than one such notice was received on the same day, proportionately based upon the amount of the union and/or fringe benefit fund claims received on such day. Nothing herein contained shall prevent the Agency from commencing an interpleader action to determine entitlement to a disputed payment in accordance with section one thousand six of the civil practice law and rules or any successor provision thereto.

E. Payment to a fringe benefit fund under this provision shall not relieve the General Contractor or Delinquent Contractor from responsibility for the work covered by the payment. Except as otherwise provided, nothing contained herein shall create any obligation on

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the part of the Agency to pay any union or fringe benefit fund, nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed, between the union/fund and/or fringe benefit and the Agency.

**ARTICLE 12- HOURS OF WORK, PREMIUM PAYMENTS,
SHIFTS AND HOLIDAYS**

SECTION 1. WORK WEEK AND WORK DAY

A. The standard work week shall consist of 40 hours of work at straight time rates, Monday through Friday, 8 hours per day, plus ½ hour unpaid lunch period.

B. In accordance with Program needs, there shall be flexible start times with advance notice from Contractor to the Union. The Day Shift shall commence between the hours of 6:00 a.m. and 9:00 a.m. and shall end between the hours of 2:30 p.m. and 5:30 p.m., for an 8 hour day, and up to 7:30 p.m. for a 10 hour day. The Evening Shift shall commence between the hours of 3:00 p.m. and 6:00 p.m., unless different times are necessitated by the Agency's phasing plans on specific projects. The Night Shift shall commence between the hours of 11:00 p.m. and 2:00 a.m., unless different times are necessitated by the Agency's phasing plans on specific projects. Subject to the foregoing, starting and quitting times shall occur at the Program Work site designated by the Contractor.

C. Scheduling - Monday through Friday is the standard work week; 8 hours of work plus ½ hour unpaid lunch. Notwithstanding any other provision of this Agreement, a contractor may schedule a four day work week, 10 hours per day at straight time rates, plus a ½ hour unpaid lunch, at the commencement of the job.

D. Notice - Contractors shall provide not less than 5 days prior notice to the Local Union involved as to the work week and work hour schedules to be worked or such lesser notice as may be mutually agreed upon.

SECTION 2. OVERTIME

Overtime shall be paid for any work over eight (8) hours in a day where 5/8s is scheduled or for work over ten (10) hours in a day where 4/10s is scheduled and over forty (40) hours in a week, at time and one half (1½) Monday through Saturday. All overtime work performed on Sunday and Holidays will be paid pursuant to the applicable Schedule A. There shall be no stacking or pyramiding of overtime pay under any circumstances. There will be no restriction upon the Contractor's scheduling of overtime or the nondiscriminatory designation of employees who shall be worked, including the use of employees, other than those who have worked the regular or scheduled work week, at straight time rates. The Contractor shall have the right to schedule work so as to minimize overtime or schedule overtime as to some, but not all, of the crafts and whether or not of a continuous nature.

SECTION 3. SHIFTS

A. Flexible Schedules - Scheduling of shift work, including Saturday and Sunday work, shall be within the discretion of the Contractor in order to meet Program Work schedules and existing Program Work conditions including the minimization of interference with the mission of the Agency. It is not necessary to work a day shift in order to schedule a second or third shift, or a second shift in order to schedule a third shift, or to schedule all of the crafts when only certain crafts or employees are needed. Shifts must have prior approval of the Agency or Construction Manager, and must be scheduled with not less than five work days notice to the Local Union or such lesser notice as may be mutually agreed upon.

B. Second and/or Third Shifts/Saturday and/or Sunday Work - - The second shift shall start between 3 p.m. and 6 p.m. and the third shift shall start between 11 p.m. and 2 a.m., subject to different times necessitated by the Agency phasing plans on specific projects. There shall be no reduction in shift hour work. With respect to second and third shift work there

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shall be a 5% shift premium. No other premium or other payments for such work shall be required unless such work is in excess of 40 hours in the week. All employees within a classification performing Program Work will be paid at the same wage rate regardless of the shift or work scheduled work, subject only to the foregoing provisions.

C. Flexible Starting Times - Shift starting times will be adjusted by the Contractor as necessary to fulfill Program Work requirements subject to the notice requirements of paragraph A.

SECTION 4. HOLIDAYS

A. Schedule - There shall be 8 recognized holidays on the Project:

New Years Day	Labor Day
Martin Luther King Day	President's Day
Memorial Day	Thanksgiving Day
Independence Day	Christmas Day

All said holidays shall be observed on the calendar date except those holidays which occur on Saturday shall be observed on the previous Friday and those that occur on Sunday shall be observed on the following Monday.

B. Payment - Regular holiday pay, if any, for work performed on such a recognized holiday shall be in accordance with the applicable Schedule A.

C. Exclusivity - No holidays other than those listed in Section 4(A) above shall be recognized or observed.

SECTION 5. SATURDAY MAKE-UP DAYS

When severe weather, power failure, fire or natural disaster or other similar circumstances beyond the control of the Contractor prevent work from being performed on a regularly scheduled weekday, the Contractor may schedule a Saturday make-up day and such

time shall be scheduled and paid as if performed on a weekday. Any other Saturday work shall be paid at time and one-half (1½). The Contractor shall notify the Local Union on the missed day or as soon thereafter as practicable if such a make-up day is to be worked.

SECTION 6. REPORTING PAY

A. Employees who report to the work location pursuant to their regular schedule and who are not provided with work shall be paid two hours reporting pay at straight time rates. An employee whose work is terminated early by a Contractor due to severe weather, power failure, fire or natural disaster or for similar circumstances beyond the Contractor's control, shall receive pay only for such time as is actually worked. In other instances in which an employee's work is terminated early (unless provided otherwise elsewhere in this Agreement), the employee shall be paid for his full shift.

B. When an employee, who has completed their scheduled shift and left the Program Work site, is "called out" to perform special work of a casual, incidental or irregular nature, the employee shall receive overtime pay at the rate of time and one-half of the employee's straight time rate for hours actually worked.

C. When an employee leaves the job or work location of their own volition or is discharged for cause or is not working as a result of the Contractor's invocation of Section 7 below, they shall be paid only for the actual time worked.

D. Except as specifically set forth in this Article there shall be no premiums, bonuses, hazardous duty, high time or other special premium payments or reduction in shift hours of any kind.

E. There shall be no pay for time not actually worked except as specifically set forth in this Article and except where an applicable Schedule A requires a full weeks' pay for forepersons.

SECTION 7. PAYMENT OF WAGES

A. Termination- Employees who are laid off or discharged for cause shall be paid in full for that which is due them at the time of termination. The Contractor shall also provide the employee with a written statement setting forth the date of lay off or discharge.

SECTION 8. EMERGENCY WORK SUSPENSION

A Contractor may, if considered necessary for the protection of life and/or safety of employees or others, suspend all or a portion of Program Work. In such instances, employees will be paid for actual time worked, except that when a Contractor requests that employees remain at the job site available for work, employees will be paid for that time at their hourly rate of pay.

SECTION 9. INJURY/DISABILITY

An employee who, after commencing work, suffers a work-related injury or disability while performing work duties, shall receive no less than 8 hours wages for that day. Further, the employee shall be rehired at such time as able to return to duties provided there is still Program Work available for which the employee is qualified and able to perform.

SECTION 10. TIME KEEPING

A Contractor may utilize brassing or other systems to check employees in and out. Each employee must check in and out. The Contractor will provide adequate facilities for checking in and out in an expeditious manner.

SECTION 11. MEAL PERIOD

A Contractor shall schedule an unpaid period of not more than 1/2 hour duration at the work location between the 3rd and 5th hour of the scheduled shift. A Contractor may, for efficiency of operation, establish a schedule which coordinates the meal periods of two or more crafts or which provides for staggered lunch periods within a craft or trade. If an employee is

required to work through the meal period, the employee shall be compensated in a manner established in the applicable Schedule A.

SECTION 12. BREAK PERIODS

There will be no rest periods, organized coffee breaks or other non-working time established during working hours. Individual coffee containers will be permitted at the employee's work location. Where 4/10s are being worked there shall be a morning and an afternoon coffee break.

ARTICLE 13 - APPRENTICES

SECTION 1. RATIOS

Recognizing the need to maintain continuing supportive programs designed to develop adequate numbers of competent workers in the construction industry and to provide craft entry opportunities for minorities, women and economically disadvantaged non-minority males, Contractors will employ apprentices in their respective crafts to perform such work as is within their capabilities and which is customarily performed by the craft in which they are indentured. Contractors may utilize apprentices and such other appropriate classifications in the maximum ratio permitted by the New York State Department of Labor or the maximum allowed per trade. Apprentices and such other classifications as are appropriate shall be employed in a manner consistent with the provisions of the appropriate Schedule A. The parties encourage, as an appropriate source of apprentice recruitment consistent with the rules and operations of the affiliated unions' apprentice-programs, the use of the Edward J. Malloy Initiative for Construction Skills, Non-Traditional Employment for Women and Helmets to Hardhats.

ARTICLE 14-SAFETY PROTECTION OF PERSON AND PROPERTY

SECTION 1. SAFETY REQUIREMENTS

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Each Contractor will ensure that applicable OSHA and safety requirements are at all times maintained on the Program Work site and the employees and Unions agree to cooperate fully with these efforts to the extent consistent with their rights and obligations under the law. Employees will cooperate with employer safety policies and will perform their work at all times in a safe manner and protect themselves and the property of the Contractor and Agency from injury or harm, to the extent consistent with their rights and obligations under the law. Failure to do so will be grounds for discipline, including discharge.

SECTION 2. CONTRACTOR RULES

Employees covered by this Agreement shall at all times be bound by the reasonable safety, security, and visitor rules as established by the Contractors and the Construction Manager for this Program Work. Such rules will be published and posted in conspicuous places throughout the Program Work sites. Any site security and access policies established by the Construction Manager or General Contractor intended for specific application to the construction workforce for Program Work and that are not established pursuant to an Agency directive shall be implemented only after notice to the BCTC and its affiliates and an opportunity for negotiation and resolution by the Labor Management Committee.

SECTION 3. INSPECTIONS

The Contractors and Construction Manager retain the right to inspect incoming shipments of equipment, apparatus, machinery and construction materials of every kind.

ARTICLE 15 - TEMPORARY SERVICES

Temporary services, i.e. all temporary heat, water, power and light, shall only be required upon the specific request of the Agency or Construction Manager, and when so requested shall be assigned to the appropriate trade claiming jurisdiction. Temporary system coverage shall be provided by the appropriate Contractors' existing employees during working hours in which a

shift is scheduled for employees of this Contractor. The Agency or Construction Manager may determine the need for temporary system coverage requirements during non-working hours. There shall be no stacking of trades on temporary services. In the event a temporary system is claimed by multiple trades, the matter shall be resolved through the New York Plan for Jurisdictional Disputes.

ARTICLE 16 - NO DISCRIMINATION

SECTION 1. COOPERATIVE EFFORTS

The Contractors and Unions agree that they will not discriminate against any employee or applicant for employment because of creed, race, color, religion, sex, sexual orientation, national origin, marital status, citizenship status, disability, age or any other status provided by law, in any manner prohibited by law or regulation.

SECTION 2. LANGUAGE OF AGREEMENT

The use of the masculine or feminine gender in this Agreement shall be construed as including both genders.

ARTICLE 17- GENERAL TERMS

SECTION 1. PROJECT RULES

A. The Construction Manager and the Contractors shall establish such reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work. These rules will be explained at the pre-job conference and posted at the Program Work sites and may be amended thereafter as necessary. Notice of amendments will be provided to the appropriate Local Union. Failure of an employee to observe these rules and regulations shall be grounds for discipline, including discharge. The fact that no order was posted prohibiting a certain type of misconduct shall not be a defense to an employee disciplined or discharged for such misconduct when the action taken is

for cause.

B. The parties adopt and incorporate the BCTC's Standards of Excellence as annexed hereto as Exhibit "B".

SECTION 2. TOOLS OF THE TRADE

The welding/cutting torch and chain fall are tools of the trade having jurisdiction over the work performed. Employees using these tools shall perform any of the work of the trade. There shall be no restrictions on the emergency use of any tools or equipment by any qualified employee or on the use of any tools or equipment for the performance of work within the employee's jurisdiction.

SECTION 3. SUPERVISION

Employees shall work under the supervision of the craft foreperson or general foreperson.

SECTION 4. TRAVEL ALLOWANCES

There shall be no payments for travel expenses, travel time, subsistence allowance or other such reimbursements or special pay except as expressly set forth in this Agreement.

SECTION 5. FULL WORK DAY

Employees shall be at their work area at the starting time established by the Contractor, provided they are provided access to the work area. The signatories reaffirm their policy of a fair day's work for a fair day's wage.

SECTION 6. COOPERATION AND WAIVER

The Construction Manager, Contractors and the Unions will cooperate in seeking any NYS Department of Labor, or any other government, approvals that may be needed for implementation of any terms of this Agreement. In addition, the Council, on their own behalf and

on behalf of its participating affiliated Local Unions and their individual members, intend the provisions of this Agreement to control to the greatest extent permitted by law, notwithstanding contrary provisions of any applicable prevailing wage, or other, law and intend this Agreement to constitute a waiver of any such prevailing wage, or other, law to the greatest extent permissible only for work within the scope of this Agreement, including specifically, but not limited to those provisions relating to shift, night, and similar differentials and premiums. This Agreement does not, however, constitute a waiver or modification of the prevailing wage schedules applicable to work not covered by this Agreement.

ARTICLE 18. SAVINGS AND SEPARABILITY

SECTION 1. THIS AGREEMENT

In the event that the application of any provision of this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or if such application may cause the loss of Program funding or any New York State Labor Law exemption for all or any part of the Program Work, the provision or provisions involved (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the remainder of the Agreement shall remain in full force and effect to the extent allowed by law (and to the extent no funding or exemption is lost), unless the part or parts so found to be in violation of law or to cause such loss are wholly inseparable from the remaining portions of the Agreement and/or are material to the purposes of the Agreement. In the event a court of competent jurisdiction finds any portion of the Agreement to trigger the foregoing, the parties will immediately enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the court determination and the intent of the parties hereto for contracts to be let in the future.

SECTION 2. THE BID SPECIFICATIONS

In the event that the Agency's (or Construction Manager's) bid specifications, or other action, requiring that a successful bidder (and subcontractor) become signatory to this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or may cause the loss of Program funding or any New York State Labor Law exemption for all or any part of the Program Work, such requirement (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the Agreement shall remain in full force and effect to the extent allowed by law and to the extent no funding or exemption is lost). In such event, the Agreement shall remain in effect for contracts already bid and awarded or in construction only where the Agency and Contractor voluntarily accepts the Agreement. The parties will enter into negotiations as to modifications to the Agreement to reflect the court or other action taken and the intent of the parties for contracts to be let in the future.

SECTION 3. NON-LIABILITY

In the event of an occurrence referenced in Section 1 or Section 2 of this Article, neither the Agency, the Construction Manager, any Contractor, nor any Union shall be liable, directly or indirectly, for any action taken, or not taken, to comply with any court order or injunction, other determination, or in order to maintain funding or a New York State Labor Law exemption for Program Work. Bid specifications will be issued in conformance with court orders then in effect and no retroactive payments or other action will be required if the original court determination is ultimately reversed.

SECTION 4. NON-WAIVER

Nothing in this Article shall be construed as waiving the prohibitions of Article 7 as to signatory Contractors and signatory Unions.

ARTICLE 19 - FUTURE CHANGES IN SCHEDULE A AREA CONTRACTS

SECTION 1. CHANGES TO AREA CONTRACTS

A. Schedule A to this Agreement shall continue in full force and effect until the Contractor and/or Union parties to the Area Collective Bargaining Agreements which are the basis for Schedule A notify the Agency and Construction Manager in writing of the hourly rate changes agreed to in that Area Collective Bargaining which are applicable to work covered by this Agreement and their effective dates.

B. It is agreed that any provisions negotiated into Schedule A collective bargaining agreements will not apply to work under this Agreement if such provisions are less favorable to those uniformly required of contractors for construction work normally covered by those agreements; nor shall any provision be recognized or applied on Program Work if it may be construed to apply exclusively, or predominantly, to work covered by this Agreement.

C. Any disagreement between signatories to this Agreement over the incorporation into Schedule A of provisions agreed upon in the renegotiation of Area Collective Bargaining Agreements shall be resolved in accordance with the procedure set forth in Article 9 of this Agreement.

SECTION 2. LABOR DISPUTES DURING AREA CONTRACT NEGOTIATIONS

The Unions agree that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity or other violations of Article 7 affecting the Program Work by any Local Union involved in the renegotiation of Area Local Collective Bargaining Agreements nor shall there be any lock-out on such Program Work affecting a Local Union during the course of such renegotiations.

ARTICLE 20 - WORKERS' COMPENSATION ADR

SECTION 1.

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

An ADR program may be negotiated and participation in the ADR Program will be optional by trade.

ARTICLE 21 - HELMETS TO HARDHATS

Section 1.

The Contractors and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Contractors and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

Section 2.

The Unions and Contractors agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective

as of the ___ day of _____, _____

FOR BUILDING AND CONSTRUCTION TRADES COUNCIL
OF GREATER NEW YORK AND VICINITY

BY: _____

Gary LaBarbera

Gary LaBarbera
President

FOR NEW YORK CITY

BY: _____

Michael R. Bloomberg
Mayor

APPROVED AS TO FORM:

ACTING CORPORATION COUNSEL
NEW YORK CITY

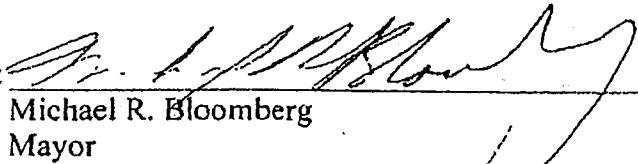
NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective
as of the ___ day of _____, _____

FOR BUILDING AND CONSTRUCTION TRADES COUNCIL
OF GREATER NEW YORK AND VICINITY

BY: _____
Gary LaBarbera
President

FOR NEW YORK CITY

BY: 
Michael R. Bloomberg
Mayor

APPROVED AS TO FORM:


ACTING CORPORATION COUNSEL
NEW YORK CITY

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List of Signatory Unions

Blasterers and Drillers Local #29

Bricklayers Local No. 1

Boiler Makers Local No. 5

Carpenters District Council

Cement Masons No. 780

Derrickmen and Riggers Union No. 197

Concrete Workers District Council No. 16, including Cement and Concrete Workers Nos. 6-A, 18-A, and 20

Electrical Local No. 3

Drywall Tapers 1974

Elevator Constructors No. 1

Heat & Frost Insulators Local Union No. 12A

Heat & Frost Insulators Local Union No. 12

Iron Workers No. 40

Iron Workers District Council

Laborers Local No. 78 Asbestos & Lead Abatement

Iron Workers No. 361

Laborers Construction and General Building No. 79

Laborers Local 731

Lathers Metallic Local No. 46

Local Union 8A Glaziers No. 1281

Mason Tenders District Council

Metal Polishers DC 9

Painters District Council No. 9

Painters Structural Steel No. 806

Ornamental Iron Workers No. 580

Plasters Local Union No. 262

Pavers & Road Builders District Council No. 1

Plumbers No. 1

Sheet Metal Workers Local No. 28

Roofers & Waterproofers No. 8

Sheet Metal Workers Local No. 137

Steamfitters Local Union No. 638; including Metal Trades Division

Teamsters Local Union 813

Teamsters Local Union 814

Tile, Marble & Terrazzo B.A.C. Local Union No. 7

PLA Schedule A

The following Collective Bargaining Agreements, as this Schedule may be amended from time to time in accordance with the Agreement, constitute Schedule A:

- (1) Agreement between the Boilermakers Association of Greater New York, Inc. and the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers AFL-CIO, Lodge No. 5, September 1, 2006 - December 31, 2009.
- (2) Agreement between Association of Cement and Concrete Contractors of New York, Inc. and Cement and Concrete Workers comprised of Local No. 6A, Local No. 18A, Local No. 20 and the Employer, July 1, 2008 - June 30, 2011.
- (3) Agreement between the Cement League and the District Council of Cement and Concrete Workers; Comprised of Local No. 6A, Local No. 18A, Local No. 20; July 1, 2008 - June 30, 2011.
- (4) Agreement between the Cement League and the United Cement Masons' Union Local No. 780, Clarified & Extended from October 23, 1940 to June 30, 2011.
- (5) Building Construction agreement between the Building Contractors Association, Inc. and the District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America, AFL-CIO, July 1, 2006 - June 30, 2011.
- (6) General Contractors Association - Carpenters 2006; Agreement Between Members of the General Contractors Association of New York, Inc. and the District Council of Carpenters of New York City and Vicinity, July 1, 2006 - June 30, 2011.
- (7) Trade Agreement between Drywall Tapers and Pointers of Greater New York Local Union 1974, affiliated with International Union of Painters and Allied Trades, AFL-CIO and Drywall Taping Contractors' Association of Greater New York and the Association of Wall-Ceiling & Carpentry Industry of New York, Inc., September 6, 2006 - June 28, 2011; Independent Agreement between Local Union 1974 and Employer.
- (8) Agreement between Allied Building Metal Industries, Inc. and Local Union Nos. 40 and 361 of the International Association of Bridge, Structural and Ornamental and Reinforcing Iron Workers AFL-CIO, July 1, 2008 - June 30, 2014.
- (9) Agreement between Independent Contractors and Local #46 Metallic Lathers Union and Reinforcing Ironworkers of New York and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers, July 1, 2008 - June 30, 2014.
- (10) Agreement of Working Conditions between the Independent Insulation Contractors Association of New York City Inc. and the International Association of Heat and Frost Insulators and Asbestos Workers Local No. 12 of New York City, 2008-2014.

- (11) Mason Tenders District Council of Greater New York Master Independent Collective Bargaining Agreement, 2008-2011.
- (12) Trade Agreement between District Council No. 9, International Union of Painters and Allied Trades, AFL-CIO and the Association of Master Painters and Decorators of New York, Inc. and the Association of Wall, Ceiling & Carpentry Industries of New York, Inc. and the Window and Plate Glass Dealers Association, May 1, 2005 - April 30, 2011.
- (13) Trade Agreement between Enterprise Association Local Union 638 and Mechanical Contractors Association of New York, Inc., July 1, 2008 - June 30, 2011.
- (14) Agreement between Allied Building Metal Industries Inc. and Architectural and Ornamental Iron Workers Local Union No. 580 AFL-CIO; July 1, 2008 - June 30, 2011.
- (15) Official Working Agreement between Service Contractors Division of the Mechanical Contractors Association of New York and Enterprise Association Metal Trades Branch Local Union 638, July 1, 2007 - June 30, 2010.
- (16) Agreement between Association of Contracting Plumbers of the City of New York, Inc. and Local Union No 1 of the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada, July 1, 2007 - June 30, 2010.
- (17) Agreement and Working Rules between New York Electrical Contractors Association, Inc. and the Association of Electrical Contractors, Inc. and Local Union No. 3 International Brotherhood of Electrical Workers, AFL-CIO, May 10, 2007 - May 13, 2010.
- (18) Official Working Agreement between Service Contractors Division of the Mechanical Contractors Association of New York, Inc. and Enterprise Association Metal Trades Branch Local Union 638, Refrigeration, Air Conditioning, Air Cooling, Oil Burner and Stoker Service and Maintenance Technicians, July 1, 2007 - June 30, 2010.
- (19) Structural Steel and Bridge Painters of Greater New York, Local Union No. 806, District Council No. 9, International Union of Painters and Allied Trades, AFL-CIO, CLC and New York Structural Steel Painting Contractors Association, Inc.; Collective Bargaining Agreement, October 1, 2005 - September 30, 2011.
- (20) Trade Agreement between United Derrickmen & Riggers Association, Local No. 197 of New York, All long Island, Westchester and Vicinity and Building Stone and Pre-Case Contractors Association, 2008.
- (21) Agreement between the Greater New York and New Jersey Tile Contractors Association, Inc., and the Tile Setters and Tile Finishers Union of New York and New Jersey, Local Union No. 7 of the International Union of Bricklayers and Allied Craftworkers, June 8, 2009 - June 2, 2013.

(22) Agreement between The Building Contractors Association, Inc. and International Union of Operating Engineers Local 15 and 15 A, July 1, 2006-June 30, 2011.

(23) Agreement dated as of July 1, 2006 between Building Contractors Association and International Union of Operating Engineers Local 14-14B, July 1, 2006-June 30, 2011.

(24) Agreement Between The Building Contractors Association, Inc. and International Union of Operating Engineers Local 15D affiliated with the AFL-CIO, July 1, 2006-June 30, 2011.

(25) Local 282 International Brotherhood of Teamsters High Rise Contract, Building Contractors Association and Independents, 2008-2013.

(26) Building, Concrete, Excavation & Common Laborers Union Local No. 731 Independent Agreement, July 1, 2006-June 30, 2012.

(27) March 17, 2009 Agreement between ThyssenKrupp Elevator Corp. and International Union of Elevator Constructors, Local 1 of NY and NJ, 2009-2014.

(28) Working Agreement Local Union No. 8 United Union of Roofers, Waterproofers and Allied Workers and Roofing and Waterproofing Contractor's Association of New York and Vicinity, July 1, 2009-June 30, 2011.

(29) Standard Form Collective Bargaining Agreement between Sheet Metal Workers' International Association Local Union #137 and the Greater New York Sign Association, July 16, 2007 - July 15, 2010.

(30) Trade Agreement between _____ and Local No. 1 New York of the International Union of Bricklayers and Allied Craftworkers, July 1, 2008 - July 30, 2011.

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Project Labor Agreement - - Letter of Assent

Dear:

The undersigned party confirms that it agrees to be a party to and be bound by the New York Agency, Project Labor Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Project Labor Agreement, its Schedules, Addenda and Exhibits are hereby incorporated by reference herein.

The undersigned, as a Contractor or Subcontractor (hereinafter Contractor) on the Project known as _____ and located at _____ (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in the Project Labor Agreement, a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all schedules; amendments and supplements now existing or which are later made thereto;
- (2) Agrees to be bound by the legally established collective bargaining agreements and local trust agreements as set forth in the Project Labor Agreement and this Agreement but only to the extent of Program Work and as required by the PLA.
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor but only to the extent of Program Work as required by the PLA.
- (4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it has engaged or may engage to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee provisions.
- (5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a Subcontractor (of any tier), to it, a duly executed Agreement to be Bound in from identical to this document.

Dated: _____

(Name of Contractor or subcontractor)

(Name of CM; GC; Contractor or
Higher Level Subcontractor)

(Authorized Officer & Title)

(Address)

(Phone) (Fax)

Contractor's State License

Sworn to before me this
____ day of _____, 2009

Notary Public

STANDARDS OF EXCELLENCE

The purpose of this Standard of Excellence is to reinforce the pride of every construction worker and the commitment to be the most skilled, most productive and safest workforce available to construction employers and users in the City of New York. It is the commitment of every affiliated local union to use our training and skills to produce the highest quality work and to exercise safe and productive work practices.

The rank and file members represented by the affiliated local unions acknowledge and adopt the following standards:

- *Provide a full days work for a full days pay;*
- *Safely work towards the timely completion of the job;*
- *Arrive to work on time and work until the contractual quitting time;*
- *Adhere to contractual lunch and break times;*
- *Promote a drug and alcohol free work site;*
- *Work in accordance with all applicable safety rules and procedures;*
- *Allow union representatives to handle job site disputes and grievances without resort to slowdowns, or unlawful job disruptions;*
- *Respect management directives that are safe, reasonable and legitimate;*
- *Respect the rights of co-workers;*
- *Respect the property rights of the owner, management and contractors.*

The Unions affiliated with the New York City Building and Construction Trades Council will expect the signatory contractors to safely and efficiently manage their jobs and the unions see this as a corresponding obligation of the contractors under this Standard of Excellence. The affiliated unions will expect the following from its signatory contractors:

- *Management adherence to the collective bargaining agreements;*
- *Communication and cooperation with the trade foremen and stewards;*
- *Efficient, safe and sanitary management of the job site;*
- *Efficient job scheduling to mitigate and minimize unproductive time;*
- *Efficient and adequate staffing by properly trained employees by trade;*
- *Efficient delivery schedules and availability of equipment and tools to ensure efficient job progress;*
- *Ensure proper blueprints, specifications and layout instructions and material are available in a timely manner*
- *Promote job site dispute resolution and leadership skills to mitigate such disputes;*
- *Treatment of all employees in a respectful and dignified manner acknowledging their contributions to a successful project.*

The affiliated unions and their signatory contractors shall ensure that both the rank and file members and the management staff shall be properly trained in the obligations undertaken in the Standard of Excellence.

NOTICE TO BIDDERS

DAMAGES FOR DELAY PILOT PROGRAM

Please be advised that this contract is part of a pilot program in which the Standard Construction Contract provisions concerning delay damages have been revised to allow contractors to be reimbursed for specified additional costs that are attributable to a delay in the performance of the work resulting from certain acts or omissions of the City agency or its representatives. Certain changes are highlighted here to alert bidders to the pilot program. Please see Articles 11, 12.3, and 13.10 of the Standard Construction Contract for a full understanding and the actual text of the pilot program. The text of the revised Standard Construction Contract is the controlling document should there be any discrepancies between this notice and the Standard Construction Contract.

Changes to Articles 11, 12.3, and 13.10 of the Standard Construction Contract permit contractors to make claims for delay damages relating to the following circumstances:

The failure of the City to take reasonable measures to coordinate and progress the Work;

Extended delays attributable to the City in the review or issuance of change orders, in shop drawing reviews and approvals or as a result of the cumulative impact of multiple change orders, which constitute a material change to the Work and which have a verifiable impact on project costs.

The unavailability of the site for an extended period of time that significantly affects the scheduled completion of the contract.

The issuance by the City of a stop work order relative to a substantial portion of work for a period exceeding thirty days, that was not brought about through any action or omission of the Contractor.

Differing site conditions that were not known or 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.

Delays caused by the City's bad faith or its willful, malicious, or grossly negligent conduct;

Delays not contemplated by the parties;

Delays so unreasonable that they constitute an intentional abandonment of the Contract by the City; and

Delays resulting from the City's breach of a fundamental obligation of the Contract.

Please see Article 11.4 for provisions regarding compensable delays.

Specific exclusions to claims for damages also apply, such as for third party (non-City) acts and omissions, court orders, strikes or *force majeure* events. For provisions related to non-compensable delays, please see Article 11.5.

For those delays where damages are available, Article 11 also sets forth what costs are recoverable. Please see Article 11.7 for which costs are recoverable and which costs are non-recoverable.

Article 11 also contains provisions concerning notice and documentation of claims. Please see Articles 11.1, 11.2, and 11.6. Contractors must comply with the notice requirements in order to preserve their claims. Consequently, please read these sections carefully. Delay damages are compensable only if they were actually, reasonably and necessarily incurred and are verified by appropriate documentation submitted at the appropriate times.

Claims for delay damages are not covered by the dispute resolution process in Article 27 of the Standard Construction Contract. See Article 11.8. When the amount of delay damages are agreed upon, such damages may be paid through a change order.

NOTICE TO BIDDERS, PROPOSERS, CONTRACTORS, AND RENEWAL CONTRACTORS

This contract includes a provision concerning the protection of employees for whistleblowing activity, pursuant to New York City Local Law Nos. 30-2012 and 33-2012, effective October 18, 2012 and September 18, 2012, respectively. The provisions apply to contracts with a value in excess of \$100,000.

Local Law No. 33-2012, the Whistleblower Protection Expansion Act (“WPEA”), prohibits a contractor or its subcontractor from taking an adverse personnel action against an employee or officer for whistleblower activity in connection with a City contract; requires that certain City contracts include a provision to that effect; and provides that a contractor or subcontractor may be subject to penalties and injunctive relief if a court finds that it retaliated in violation of the WPEA. The WPEA is codified at Section 12-113 of the New York City Administrative Code.

Local Law No. 30-2012 requires a contractor to prominently post information explaining how its employees can report allegations of fraud, false claims, criminality, or corruption in connection with a City contract to City officials and the rights and remedies afforded to employees for whistleblowing activity. Local Law No. 30-2012 is codified at Section 6-132 of the New York City Administrative Code.

WHISTLEBLOWER PROTECTION EXPANSION ACT RIDER

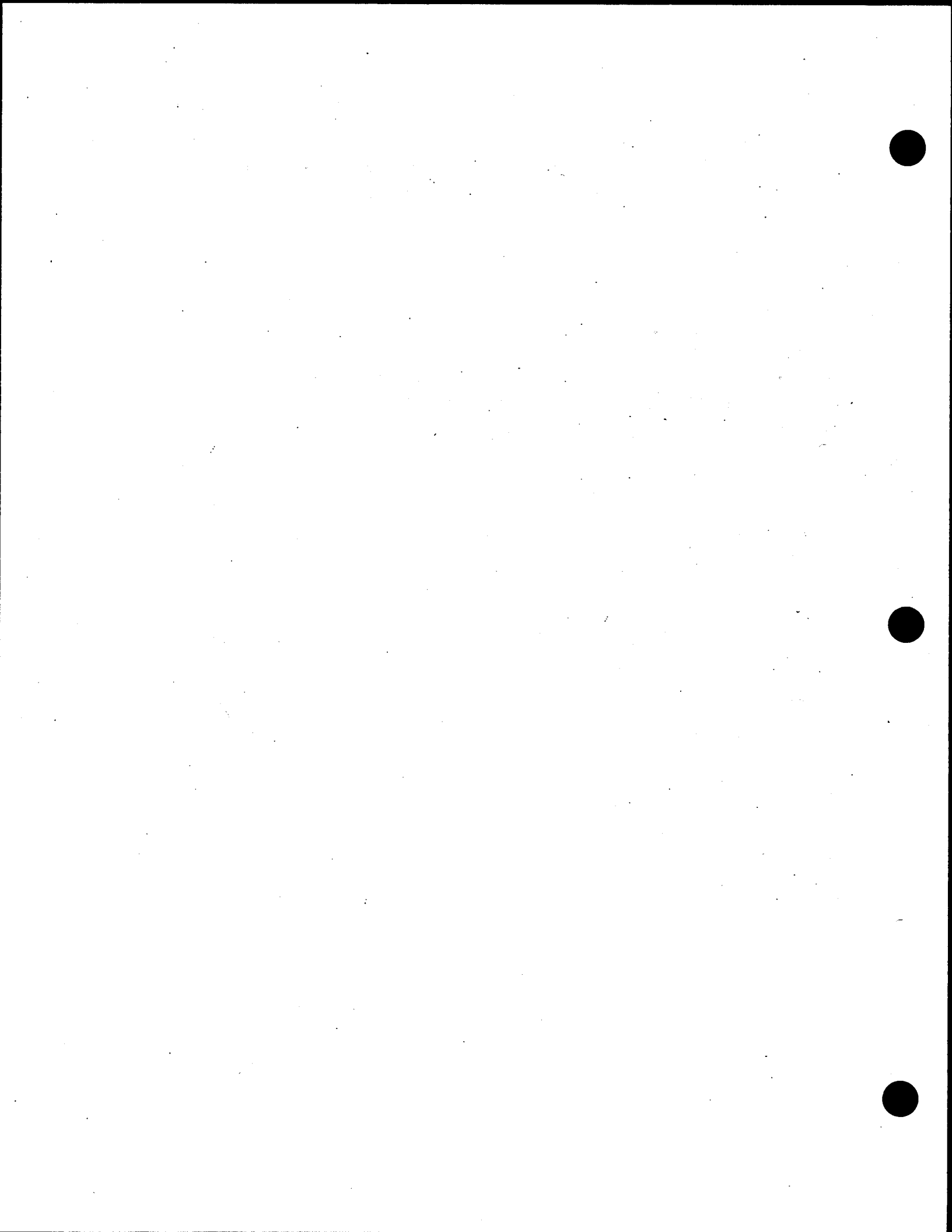
1. In accordance with Local Law Nos. 30-2012 and 33-2012, codified at sections 6-132 and 12-113 of the New York City Administrative Code, respectively,
 - (a) Contractor shall not take an adverse personnel action with respect to an officer or employee in retaliation for such officer or employee making 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 (i) the Commissioner of the Department of Investigation, (ii) a member of the New York City Council, the Public Advocate, or the Comptroller, or (iii) the City Chief Procurement Officer, ACCO, Agency head, or Commissioner.
 - (b) If any of Contractor's officers or employees believes that he or she has been the subject of an adverse personnel action in violation of subparagraph (a) of paragraph 1 of this rider, he or she shall be entitled to bring a cause of action against Contractor to recover all relief necessary to make him or her whole. Such relief may include but is not limited to: (i) an injunction to restrain continued retaliation, (ii) reinstatement to the position such employee would have had but for the retaliation or to an equivalent position, (iii) reinstatement of full fringe benefits and seniority rights, (iv) payment of two times back pay, plus interest, and (v) compensation for any special damages sustained as a result of the retaliation, including litigation costs and reasonable attorney's fees.
 - (c) 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:
 - (i) how its employees can report to the New York City Department of Investigation allegations of fraud, false claims, criminality or corruption arising out of or in connection with the Contract; and
 - (ii) the rights and remedies afforded to its employees under New York City Administrative Code sections 7-805 (the New York City False Claims Act) and 12-113 (the Whistleblower Protection Expansion Act) for lawful acts taken in connection with the reporting of allegations of fraud, false claims, criminality or corruption in connection with the Contract.
 - (d) For the purposes of this rider, "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.
 - (e) This rider is applicable to all of Contractor's subcontractors having subcontracts with a value in excess of \$100,000; accordingly, Contractor shall include this rider in all subcontracts with a value a value in excess of \$100,000.
2. Paragraph 1 is not applicable to this Contract if it is valued at \$100,000 or less. Subparagraphs (a), (b), (d), and (e) of paragraph 1 are not applicable to this Contract if it was solicited pursuant to a finding of an emergency. Subparagraph (c) of paragraph 1 is neither applicable to this Contract if it was solicited prior to October 18, 2012 nor if it is a renewal of a contract executed prior to October 18, 2012.

NOTICE TO BIDDERS

Please be advised that the City of New York has revised the form of the performance bond that is required for City construction contracts that do not exceed \$5 million. The form of bond required for contracts that are greater than \$5 million has not changed. The City now has two approved forms. One form is to be used for contracts that do not exceed \$5 million and one form is to be used for contracts above \$5 million. The City's payment bond remains unchanged.

The new bond form for contracts that do not exceed \$5 million has been approved by the U.S. Small Business Administration ("SBA") for participation in their Bond Guarantee Program. The SBA's Bond Guarantee Program enables eligible small businesses to obtain or increase bonding by having the SBA act as a partial guarantor of the contractor to the surety. If you are interested in participating in this program, we suggest that you contact your broker or the SBA.

In order to maximize participation by small businesses in the SBA Guarantee Program, the City also encourages prime contractors who are awarded contracts greater than \$5 million to allow their subcontractors to use the SBA-approved form, particularly on contracts that are subject to Local Law 129 (the M/WBE program), if the prime contractor requires subcontractors to obtain performance bonds.



Notice to Bidders:

In 2013 the City will be implementing a new web based subcontractor reporting system. Once this subcontractor reporting system is implemented, and Contractor receives notice of its implementation, Contractor will be required to list in the system all of the subcontractors that it knows it will use or is already using in the performance of this contract. For each subcontractor listed, Contractor will be required to provide the following information: maximum contract value, description of subcontractor work, start and end date of the subcontract and identification of the subcontractor's industry. Identification of subcontractors in the system along with the required information will be required in order to obtain subcontractor approval under [section 3.02 of Appendix A][Article 17 of the Standard Construction Contract] and PPB Rule § 4-13 for all subcontractors that have not been approved as of the implementation date. Thereafter, Contractor will be required to report in the system the payments made to each subcontractor within 30 days of making the 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...

When the subcontractor reporting system is implemented, Contractor will receive a written notice from the City which will contain the information the Contractor will need to list its subcontractors and report payments. Contractor will not be required to comply with the requirements set forth herein until such notice is issued. Contractor will have 30 days from the date of the notice to list its current subcontractors for which it has already received Agency approval, if any. Thereafter, for those subcontractors that have not yet been approved by the Agency, subcontractors will have to be listed in the system in order to obtain the required Agency approval.

Failure of the Contractor to list a subcontractor and/or to report subcontractor payments in a timely fashion may result in the Agency declaring the Contractor in default of the Contract and may 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. For construction contracts, the provisions of Article 15 of the Standard Construction Contract shall govern the issue of liquidated damages.

Contractor hereby agrees to these provisions and acknowledges that they will become effective on the date set forth in the notice.

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CITY OF NEW YORK

**DEPARTMENT OF
DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES**

INFORMATION FOR BIDDERS

DELAY DAMAGES PILOT

September 2008

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INFORMATION FOR BIDDERS

1. Description and Location of Work

The description and location of the work for which bids are requested are specified in Attachment 1, "Bid Information". Attachment 1 is included in the Bid Booklet.

2. Time and Place for Receipt of Bids

Sealed bids shall be received on or before the date and hour specified in Attachment 1, at which time they will be publicly opened and read aloud in the presence of the Commissioner or his 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, if used, 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 at the location set forth in Attachment 1.

(C) Deposit for Copy of Invitation For Bids Documents: Prospective bidders may obtain a copy of the Invitation For Bids Documents by complying with the conditions set forth in the Notice of Solicitation. The deposit must be in the form of a check or money order made payable to the City of New York, and drawn upon a state or national bank or trust company, or a check of such bank or trust company signed by a duly authorized officer thereof.

(D) Return of Invitation For Bids Documents: All Invitation For Bids Documents must be returned to the Department upon request. If the bidder elects not to submit a bid thereunder, the Invitation For Bids Documents shall be returned to the Department, along with a statement that no bid will be submitted.

(E) Return of Deposit: Such deposit will be returned within 30 days after the award of the contract or the rejection of all bids as set forth in the advertisement, provided the Invitation For Bids Documents are returned to the location specified in Attachment 1, in physical condition satisfactory to the Commissioner.

(F) Additional Copies: Additional copies of the Invitation For Bids Documents may be obtained, subject to the conditions set forth in the advertisement for bids.

5. Pre-Bid Conference

A pre-bid conference shall be held as set forth in Attachment 1. 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 Attachment 1.

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 Attachment 1.

(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 he 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 his 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 Attachment 1, 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 his option, may ask to be relieved of his 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.
- (D) 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. VENDEX Questionnaires

(A) Requirement: Pursuant to Administrative Code Section 6-116.2 and the PPB Rules, bidders may be obligated to complete and submit VENDEX Questionnaires. Generally, if this bid is \$100,000 or more, or if this bid when added to the sum total of all contracts, concessions and franchises the bidder has received from the City and any subcontracts received from City contractors over the past twelve months, equals or exceeds \$100,000, Vendex Questionnaires must be completed. If required, Vendex Questionnaires must be completed and submitted before any award of contract may be made or before approval is given for a proposed subcontractor. Non-compliance with these submission requirements may result in the disqualification of the bid, disapproval of a subcontractor, subsequent withdrawal of approval for the use of an approved subcontractor, or the cancellation of the contract after its award.

(B) Submission: Vendex Questionnaires must be submitted directly to the Mayor's Office of Contract Services, ATTN: Vendex, 253 Broadway, 9th Floor, New York, New York 10007. In addition, the bidder must submit a Confirmation of Vendex Compliance to the agency. A form for this confirmation is set forth in the Bid Booklet.

(C) Obtaining Forms: Vendex Questionnaires, as well as detailed instructions, may be obtained at www.nyc.gov/vendex. The bidder may also obtain Vendex forms and instructions by contacting the Agency Chief Contracting Officer or the contact person for this contract.

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)669-2797.

26. Bid, Performance and Payment Security

(A) Bid Security: Each bid must be accompanied by bid security in an amount and type specified in Attachment 1. 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 Attachment 1. 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 Attachment 1. 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 202-512-1800; (2) through the Internet at <http://www.fms.treas.gov/c570/index.html>, and (3) through a computerized public bulletin board, which can be accessed by using your computer modem and dialing 202-874-6887.

(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 his 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 his 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 Bid Booklet.

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 Form, 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 to be considered part of this contract. The quantities actually required to complete the contract work may be less or more than so estimated, and if so, no action for damages or for loss of profits shall accrue to the contractor by reason thereof.

(C) Overruns: The terms and conditions applicable to overruns of unit price items are set forth in Article 26 of the Contract.

34. Excise Tax

Bidders are referred to the Specifications for information on Federal Excise Tax exemptions.

35. Licenses and Permits

The successful bidder will be required to obtain all necessary licenses and permits necessary to perform the work.

36. Multiple Prime Contractors

If more than one prime contractor will be involved on this project, all contractors are required to examine the Invitation for Bid packages for all other parts of the project.

37. Locally Based Enterprise Requirements (LBE)

This Contract is subject to the requirements of Administrative Code, Section 6-108.1, and the regulations promulgated thereunder. No construction contract will be awarded unless and until these requirements have been complied with in their entirety. The bidder is advised of the provisions set forth below, as well as the provisions with respect to the Locally Based Enterprise Program contained in Article 67 of the Contract. The contractor is advised that:

(A) If any portion of the Contract is subcontracted, not less than ten percent of the total dollar amount of the contract shall be awarded to locally based enterprises ("LBEs"); except, where less than ten percent of the total dollar amount of the Contract is subcontracted, such lesser percentage shall be so awarded.

(B) No contractor shall require performance and payment bonds from LBE subcontractors.

(C) No Contract shall be awarded unless the contractor first identifies in its bid:

- (1) the percentage, dollar amount and type of work to be subcontracted; and
- (2) the percentage, dollar amount and type of work to be subcontracted to LBEs.

(D) Within ten calendar days after notification of low bid, the apparent low bidder shall submit an "LBE Participation Schedule" to the contracting agency. If such schedule does not identify sufficient LBE subcontractors to meet the requirements of Administrative Code Section 6-108.1, the apparent low bidder shall submit documentation of its good faith efforts to meet such requirements.

(1) The "LBE Participation Schedule" shall include:

- (a) the name and address of each LBE that will be given a subcontract,
- (b) the percentage, dollar amount and type of work to be subcontracted to the LBE, and
- (c) the dates when the LBE subcontract work will commence and end.

- (2) The following documents shall be attached to the "LBE Participation Schedule":
- (a) verification letters from each subcontractor listed in the "LBE Participation Schedule" stating that the LBE will enter into a formal agreement for work,
 - (b) certification documents of any proposed LBE subcontractor which is not on the LBE certified list, and
 - (c) copies of the certification letter of any proposed subcontractor which is an LBE.
- (3) Documentation of good faith efforts to achieve the required LBE percentage shall include as appropriate but not limited to the following:
- (a) attendance at prebid meetings, when scheduled by the agency, to advise bidders of contract requirements;
 - (b) advertisement where appropriate in general circulation media, trade association publications and small business media of the specific subcontracts that would be at least equal to the percentage goal for LBE utilization specified by the contractor;
 - (c) written notification to association of small, minority and women contractors soliciting specific subcontractors;
 - (d) written notification by certified mail to LBE firms that their interest in the contract is solicited for specific work items and their estimated values;
 - (e) demonstration of efforts made to select portions of the work for performance by LBE firms in order to increase the likelihood of achieving the stated goal;
 - (f) documented efforts to negotiate with LBE firms for specific subcontracts, including at a minimum:
 - (i) The names, address and telephone numbers of LBE firms that are contacted;
 - (ii) A description of the information provided to LBE firms regarding the plans and specifications for portions of the work to be performed;
 - (iii) Documentation showing that no reasonable price can be obtained from LBE firms;
 - (iv) A statement of why agreements with LBE firms were not reached;
 - (g) a statement of the reason for rejecting any LBE firm which the contractor deemed to be unqualified; and
 - (h) documentation of efforts made to assist the LBE firms contacted that needed assistance in obtaining required insurance.

(E) Unless otherwise waived by the Commissioner with the approval of the Office of Economic and Financial Opportunity, failure of a proposed contractor to provide the information required by paragraphs (C) and (D) above may render the bid non-responsive and the Contract may not be awarded to the bidder. If the contractor states that it will subcontract a specific portion of the work, but can demonstrate despite good faith efforts it cannot achieve its required LBE percentage for subcontracted work until after award of Contract, the Contract may be awarded, subject to a letter of compliance from the contractor stating that it will comply with Administrative Code Section 6-108.1 and subject to approval by the Commissioner. If the contractor has not met its required LBE percentage prior to award, the contractor shall demonstrate that a good faith effort has been made subsequent to award to obtain LBEs on each subcontract until it meets the required percentage.

(F) When a bidder indicates prior to award that no work will be subcontracted, no work may be subcontracted without the prior written approval of the Commissioner, which shall be granted only if the contractor in good faith seeks LBE subcontractors at least six weeks prior to the start of work.

(G) The contractor may not substitute or change any LBE which was identified prior to award of the contract without the written permission of the Commissioner. The contractor shall make a written application to the Commissioner for permission to make such substitution or change, explaining why the contractor needs to change its LBE subcontractor and how the contractor will meet its LBE subcontracting requirement. Copies of such application must be served on the originally identified LBE by certified mail return receipt requested, as well as the proposed substitute LBE. The Commissioner shall determine whether or not to grant the contractor's request for substitution.

38. Bid Submission Requirements

The Bid Submission Requirements are set forth on page 2 of the Bid Booklet.

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.

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
SAFETY REQUIREMENTS

THE DDC SAFETY REQUIREMENTS INCLUDE THE FOLLOWING SECTIONS:

- I. POLICY ON SITE SAFETY**
- II. PURPOSE**
- III. DEFINITIONS**
- IV. RESPONSIBILITIES**
- V. SAFETY QUESTIONNAIRE**
- VI. SAFETY PROGRAM AND SITE SAFETY PLAN**
- VII. KICK-OFF/PRE-CONSTRUCTION MEETINGS AND SAFETY REVIEW**
- VIII. EVALUATION DURING WORK IN PROGRESS**
- IX. SAFETY PERFORMANCE EVALUATION**

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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 jobsites must, at a minimum, comply with applicable federal, state and city laws, rules and regulations, including without limitation:

- ❑ U. S. Department of Labor 29 Code of Federal Regulations (CFR) Part 1926 and applicable Sub-parts of Part 1910 – U.S. Occupational Safety and Health Administration (OSHA) including, but not limited to “Respiratory Protection” (29 CFR 1910.134), “Permit-Required Confined Spaces” (29 CFR 1910.146), and “Hazard Communication” (29 CFR 1910.1200);
- ❑ New York State Department of Labor Industrial Code Rule 23 – Protection in Construction, Demolition and Excavation;
- ❑ New York City Construction Codes, Title 28
- ❑ NYC Department of Transportation Title 34 Chapter 2 – Highway Rules
- ❑ New York State Department of Labor Industrial Code Rule 753
- ❑ NYC Local Law No. 113 (2005) Noise Control Code

In addition, all regulations promulgated by the NYC Department of Transportation, including requirements for Maintenance and Protection of Traffic (MPT), are applicable when contained in contract specifications. While MPT is a significant component of work in our Infrastructure Division, it does not supersede or exempt Contractors from complying with other applicable health and safety standards (for example, excavating and trenching standards, operation of heavy equipment and compliance with City environmental and noise regulations).

I. 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 hazard, 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 shall mean the person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the 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.

Construction Safety Auditor: A representative of the QACS Construction Safety Unit 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 surveys, reviewing health and safety plans, reviewing construction permits, and rendering technical advice and assistance to DDC Resident Engineers and Project Managers.

Construction Safety Unit: A part of QACS within the Division of Technical Support that assesses contractor safety on DDC jobsites and advises responsible parties of needed corrective actions.

Construction Superintendent: A representative of the contractor responsible for overseeing performance of the required construction work. This individual must engage in sound construction practices, and is responsible to maintain a safe work site. In the case of a project involving the demolition, alteration or new construction of buildings, the Construction Superintendent must be licensed by the NYC Department of Buildings.

Contractor: For purposes of these Safety Requirements, the term "Contractor" shall mean any person or entity that enters into a contract for the performance of construction work on a DDC project. The term "Contractor" shall 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").

Director - Quality Assurance and Construction Safety (QACS): Responsible for the operations of the QACS Construction Safety Unit and the DDC Site Safety management programs.

Job Hazard Assessment (JHA): A process of identifying site-specific hazards that may be present during construction and establishing the means and methods to reduce or eliminate those hazards.

Jobsite Safety Coordinator: A person designated by the Contractor to be onsite during all activities. This individual shall have received, at a minimum, the OSHA 10-hour construction safety program. Other examples of acceptable training are the 30-hour OSHA Safety and Health Standards for the Construction Industry training program (OSHA 510) or a degree/certificate in a safety and health from a college-level curriculum. This person does not necessarily have to be dedicated full-time to site safety, but must have sufficient experience and authority to undertake corrective action and must qualify to be a competent person. For certain projects, as defined in NYC Construction Codes – Title 28, this person may be required to have a Site Safety Manager's License issued by the NYC DOB.

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 and trenching and shoring, among others.

Resident Engineer (RE) / Construction Project Manager (CPM): Representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the work. (The RE/CPM may be a third-party consultant, including a CM, retained by DDC.)

Safety Program: Established by the Contractor that covers all operations of that Contractor and establishes the Contractor's overall safety policy, regulatory compliance plan and minimum safety standards. The Safety Program must be submitted prior to the commencement of work at the site and is subject to review and acceptance by the Construction Safety Unit.

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 Plan: A site-specific safety plan developed by the Contractor for a specific project. The Site Safety Plan must identify hazards associated with the project, and include specific safety precautions and training appropriate and necessary to complete the work. The Site Safety Plan must be submitted prior to the commencement of work at the site and is subject to review and acceptance by the Construction Safety Unit.

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 documented 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.

IV. RESPONSIBILITIES

All persons who manage, perform, and provide support for construction projects shall 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 / Construction Project Manager / Construction Manager

- Monitors the issuance of safety- related permits, approvals and drawings and maintains copies on site.
- Monitors construction-related work activities to confirm that they are conducted in accordance with DDC policies and all applicable regulations that pertain to construction safety.
- Maintains documentation and periodically attends weekly safety meeting.
- Notifies the Construction Safety Unit and the ACCO's Insurance and Risk Management Unit of project- related accidents and emergencies, as per DDC's Construction Safety Emergency Protocol.
- Gathers facts related to all accidents and prepares DDC Accident Reports.
- Notifies the Construction Safety Unit of outside regulatory agency inspections and forwards a copy of the inspection report within three days of its receipt.
- Monitors the conditions at the site for conformance with the Site Safety Plan and DDC construction documents.
- Notifies the contractor and DDC in the event that any condition or activity exists that is not in compliance with the 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.
- Notifies DDC of any emergency condition and directs the contractor to provide such labor, materials, equipment and supervision to abate such conditions.
- Reports gross safety violations to the Construction Safety Unit immediately.

A. Contractors

- Complete a Safety Questionnaire and submit with its bid or as part of a pre-qualification package.
- Provide a Written Job Hazard Assessment (JHA) that identifies expected safety issues of the work to be performed. JHA shall be included with the Site Safety Plan submitted by the contractor.
- Submit a Site Safety Plan and Safety Program within 15 days of issuance of the Notice to Proceed, or as otherwise directed. The Site Safety Plan and Safety Program are subject to review and acceptance by the Construction Safety Unit prior to the commencement of work at the site. The Site Safety Plan shall be revised and updated as necessary.
- Ensure that all employees are aware of the hazards associated with the project through formal and informal training and/or other communications. Conduct and document weekly safety meetings for the duration of the project. Documentation to be provided to the RE/CPM/CM on a monthly basis.
- Name a Construction Superintendent, if required.
- Name a Job Site Safety Coordinator. The Contractor will be required to identify the Job Site Safety Coordinator in the Site Safety Plan.
- Comply with all mandated federal, state and local safety and health rules and regulations.
- Comply with all provisions of the Site Safety Plan.
- As part of the Site Safety Plan, prepare a site specific MPT (if not otherwise provided in the contract documents) and comply with all of its provisions.
- Conduct and document site-specific safety orientation for Contractor 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 Job Site Safety Coordinator will conduct this training prior to mobilization and provide documentation to the RE/CPM/CM.
- 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.).
- Report unsafe conditions or hazards to the DDC RE/CPM/CM as soon as practical, but no more than 24 hours after discovery, and take action to remove or abate such conditions.

- Report any accident involving injuries to workers or the general public, as well as property damage, to the DDC RE/CPM/CM within two (2) hours.
- Notify the DDC RE/CPM/CM within two (2) hours of the start of an inspection by any regulatory agency personnel, including OSHA.
- Maintain all records pertaining to all required compliance documents and accident and injury reports.
- Respond to DDC recommendations on safety, which shall 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 and environmental 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 must submit a completed DDC Safety Questionnaire listing their workers' compensation experience modification rating and OSHA Incidence 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 must provide the requested update within 30 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 years; and
- Criteria 4: A fatality (worker or member of public) experienced on or near Contractor's worksite within the last three (3) years; and
- Criteria 5: ~~An unacceptable rating by QACS based on past performance on DDC projects; and~~
- Criteria 6: Contractor has in place an acceptable corporate safety program and its employees shall have completed all documented relative safety training; and
- Criteria 7: Contractor shall provide OSHA Injury Records (currently OSHA 300 Log) for the last three (3) years.

If the Contractor fails to meet the basic criteria listed above, the Construction Safety Unit may request, through the ACCO, more detail concerning the Contractor's safety experience. DDC may request the Contractor to provide copies of, among other things, OSHA records, OSHA and DOB citations, EPA citations and written Safety Programs.

VI. SAFETY PROGRAM AND SITE SAFETY PLAN

Within fifteen (15) days of issuance of the Notice to Proceed, or as otherwise directed, the Contractor shall submit the following: (1) Safety Program, and (2) Site Safety Plan. The Safety Program shall set forth the Contractor's overall safety policy, regulatory compliance plan and minimum safety standard, and the Site Safety Plan shall identify hazards associated with the project, and include specific safety precautions and training appropriate and necessary to complete the work. The Safety Program and the Site Safety Plan are subject to review and acceptance by the Construction Safety Unit prior to the commencement of work at the site. Failure by the contractor to submit an acceptable Site Safety Plan and Safety Program shall be grounds for default.

The Site Safety Plan shall apply to all Contractor and subcontractor operations, and shall have at a minimum, the following elements. Each element shall be described in a separate section in the written document. It may be necessary to modify the basic format for certain unique or high-risk projects (such as tunnels or high-rise construction). The basic elements are as follows:

1. **Responsibility and Organization:** Identify the person or persons with authority and responsibility for implementing the Site Safety Plan. Provide an organization chart and define levels of authority and responsibility. Identify the Competent Person, the Construction Superintendent (if required), the Job Safety Coordinator and the Qualified Person required for this project.
2. **Communication:** Establish a system for communicating with employees and subcontractors on matters relating to worker and public safety and health and environmental protection, including provisions designed to encourage employees to inform the employer of hazards at the worksite without fear of reprisal. An emergency response notification protocol is to be established that also includes after hours contact numbers. The plan must also include provisions for weekly safety meetings held by the Job Site Safety Coordinator.
3. **Job Hazard Assessment:** A written document submitted by the contractor, used to identify expected job hazards and public safety risks and state the specific means and methods to reduce, control or eliminate those hazards. This part of the Site Safety Plan must also include how on-going evaluations of those risks and hazards will be carried out, including plans for periodic inspections to identify unsafe conditions, work practices and public safety hazards.
4. **Accident/Exposure Investigation:** Establish a procedure to investigate and report occupational and public injury or illness, property damage, vehicle accidents or other mishaps.
5. **Hazard Correction:** Establish means, methods and/or procedures for correcting unsafe or unhealthy conditions that might be exposing both the public and workers to hazards. Corrective actions must be taken immediately when observed or discovered. Should an imminent hazard exist which cannot be immediately abated without endangering employees, the public and/or property, remove or restrict all exposed persons from the area except those necessary to correct the existing condition. Employees necessary to correct the hazardous condition shall be provided the necessary safeguards. When corrective actions cannot be taken immediately, temporary measures should be taken until such time permanent measures are taken to eliminate the potential risks or hazards
6. **Training:** Describe site-specific hazard training programs. In addition to the required safety orientation, additional site specific training, in the form of required weekly safety meetings, will be required. Contractors must also initiate training when: a) new employees are hired; b) employees are given new job assignments for which training has not been previously received; c) new substances, processes, procedures or equipment are introduced that might represent a new public or worker hazard; d) the employee is made aware of a new or previously unrecognized hazard; e) new supervisors are assigned to familiarize themselves with the safety and health hazards to which employees under their immediate direction and control may be exposed; and f) after a jobsite incident or accident has occurred.
7. **Recordkeeping:** Establish procedures to maintain records of scheduled and periodic inspections, weekly safety meetings, and training records. Updated records shall be maintained at the jobsite, accessible to the Construction Safety Auditors and/or Quality Assurance Auditors/RE/CPM, and retained in accordance with DDC policy.

The most critical component of the Site Safety Plan is the Job Hazard Assessment section. This section must address specific hazards that are anticipated throughout the project. Each Site Safety Plan must address, at a minimum:

- Public and pedestrian safety
- Fall protection
- Electrical hazards
- Scaffolding
- Fire protection
- Emergency notification & response
- Housekeeping / debris removal
- Dust control
- Maintenance and protection of traffic
- Trenching and excavating
- Heavy equipment operations
- Material / equipment storage
- Environmental contamination
- Sheeting and shoring
- Alcohol and Drug Abuse Policy

The following additional hazards must be addressed, if applicable, based on the contract safety specifications and/or the results of the JHA (the list is not all-inclusive):

- Basic Personal Protective Equipment
- Compressed Air
- Compressed Gas Cylinders
- Cranes, Derricks and Hoists
- Demolition
- Electrical safety
- Excavations and Trenching
- Fall Protection – Floor openings/Stairways
- Fall Protection – Guardrails Toe boards etc
- Fall Protection – Leading Edge
- Fall Protection – Personal Fall Protection Devices
- Fire Protection and Fire Prevention
- Hazard Communication (RIGHT TO KNOW)
- Hazardous Energy & Lock Out / Tag Out
- Housekeeping/ Sanitation
- Maintenance and Protection of Traffic (MPT)
- Man Lifts /Aerial Lifts
- Marine Operations
- Motor Vehicle Safety
- Overhead Power lines
- Permit Required Confined Space
- Portable Ladders
- Powered Actuated Tools
- Powered Material Handling Equipment
- Scaffolds – Mobile
- Scaffolds – Stationary
- Scaffolds – Suspended
- Slings
- Steel Erection
- Welding and Cutting (Hot Work)
- Airborne Contaminants – Particulates – General
- Asbestos
- Blood borne Pathogens
- Hearing Protection
- Lead in Construction
- Mercury in Construction
- PCB's
- Respiratory Protection
- Silica
- Thermal Stress
- West Nile Virus
- Rodents and Vermin
- Noise Mitigation Plan

Certain DDC programs, such as Job Order Contracting System (JOCS), may not necessarily require Site Safety Plans. The JOCS contractor will be required to submit a Safety Program. In addition, certain DDC Operating Units may establish program or client-specific safety requirements. The contractor's Site Safety Plan must address such program or client specific safety requirements.

VII. KICK-OFF MEETINGS/PRE-CONSTRUCTION AND SAFETY REVIEW

As part of the construction kick-off meeting, a Site Safety Plan review will be part of the agenda. A QACS representative will participate in this meeting with the contractor prior to the start of the project for the purpose of:

- A. Reviewing the safety issues detailed in the contract.
- B. Reviewing the Site Safety Plan.
- C. Reviewing any new issues or information that was not previously addressed.
- D. Discussing planned inspections and audits of the site by DDC 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 Construction Safety Unit or other designated DDC representative or Consultant during regular, unannounced inspections of the job site. Field Exit Conferences will be held with the RE/CPM, Contractor Superintendents or Safety Representatives.
- B. The RE/CPM will continually monitor the safety and environmental performance of the contractor's employees and work methods. Deficiencies shall be brought to the attention of the contractor's representative on site for immediate correction. The DDC representative will maintain a written record of these deficiencies and forward them to the Construction Safety Unit on a weekly basis. Any critical deficiencies shall be immediately reported to QACS phone# (718) 391-1624 or (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- QACS, or designee will meet with the Contractor's safety representative, the DDC project manager, the RE/CPM, or 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 to occur with inadequate attention by the contractor, this shall, among other remedies available, be grounds for default.
- E. The contractor shall inform the Construction Safety Unit and ACCO Insurance and Risk Management Unit of all medical injuries or illnesses that require doctors' treatment resulting from an on-the-job incident within 24 hours of the occurrence. The Construction Safety Unit shall also be immediately informed of all fatalities, catastrophic accidents with more than one employee hospitalized, any injuries to members of the general public and major equipment damage (e.g., property damage, equipment rollovers, loads dropped from crane). QACS shall maintain a record of all contractor injuries and illnesses during the project and provide regular reports to the Agency.
- F. The Construction Safety Unit shall be immediately notified at the start of any NYS-DOL/ NYC-COSH/ OSHA/ EPA inspections. The Director of Quality Assurance & Construction Safety shall maintain a log of all contractor OSHA/EPA inspections and citations during the project.

IX. SAFETY PERFORMANCE EVALUATION

The contractor's safety record, including all DDC 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 shall be a reason to rate a Contractor unsatisfactory which will be reflected in the City's Vendex system and will be considered for future procurement actions as set forth in the City's Procurement Policy Board Rules.

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CITY OF NEW YORK
STANDARD CONSTRUCTION CONTRACT
DELAY DAMAGES PILOT

September 2008

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**CITY OF NEW YORK
STANDARD CONSTRUCTION CONTRACT**

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CITY OF NEW YORK

STANDARD CONSTRUCTION CONTRACT (September 2008)

The Standard Construction Contract dated September 2008 (the "Contract") is amended as set forth below.

- Article 77: Article 77, Part A, Section 5 is deleted in its entirety and replaced with the following:
 5. Where a Subcontractor 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. **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 a contract that is subject to a Project Labor Agreement] where the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades [i.e., 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 of the Wicks trades, regardless of what point in the life of the contract such subcontracts will occur, at the time of bid submission. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.**

- Article 77: Article 77, Part A, Section 11 is deleted in its entirety and replaced with the following:
 11. **Modification of Subcontractor Utilization Plan.** A Contractor may request a modification of its Subcontractor Utilization Plan (Subcontractor Participation Goals) 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 a contract that is subject to a Project Labor Agreement] where the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades [i.e., 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 Subcontractor Utilization Plan as part of its bid submission. The Agency may grant a request for Modification of a Contractor's Subcontractor 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 Subcontractor Participation Goals. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:**

Sub-paragraphs (a) through (h) remain unchanged.

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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 content 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 this Contract:

1.1.1 All provisions required by law to be inserted in this Contract, whether actually inserted or not;

1.1.2 The Contract Drawings and Specifications;

1.1.3 The General Conditions and Special Conditions, if any;

1.1.4 The Contract;

1.1.5 The Information for Bidders; Request for Proposals; Notice of Solicitation and Proposal For Bids; Bid or Proposal, and, if used, the Bid Booklet;

1.1.6 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.

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 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.

2.1.4 "**City**" shall mean the City of New York.

2.1.5 **"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.

2.1.6 **"Commissioner"** shall mean the head of the Agency that has entered into this Contract, or his/her duly authorized representative.

2.1.7 **"Comptroller"** shall mean the Comptroller of the City of New York.

2.1.8 **"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.

2.1.9 **"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.

2.1.10 **"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.

2.1.11 **"Contractor"** shall mean the entity which executed this Contract, whether a corporation, firm, partnership, joint venture, individual, or any combination thereof, and it(s), 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.

2.1.12 **"Days"** shall mean calendar days, except where otherwise specified.

2.1.13 **"Engineer"** or **"Architect"** or **"Project Manager"** shall mean the person so designated in writing by the Commissioner to act as such in relation to this Contract, including a private Architect or Engineer or Project Manager, as the case may be.

2.1.14 **"Engineering Audit Officer"** (EAO) shall mean the person so designated by the Commissioner to perform responsible auditing functions hereunder.

2.1.15 **"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.

2.1.16 **"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.

2.1.17 **"Final Acceptance"** shall mean final written acceptance of all the Work by the Commissioner, a copy of which shall be sent to the Contractor.

2.1.18 **"Final Approved Punch List"** shall mean a list, approved in writing by the Engineer, specifying those items of Work to be completed by the Contractor after Substantial Completion and dates for the completion of each item of Work.

2.1.19 **"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.

2.1.20 **"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.

2.1.21 **"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.

2.1.22 **"Other Contractor(s)"** shall mean any Contractor (other than the entity which executed this Contract or its Subcontractors) who has a contract with the City for work on or adjacent to the building or site of the Work.

2.1.23 **"Payroll Taxes"** shall mean State Unemployment Insurance ("SUI"), Federal Unemployment Insurance (FUI) and payments pursuant to the Federal Insurance Contributions Act ("FICA").

2.1.24 **"Project"** shall mean the public improvement to which this Contract relates.

2.1.25 **"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.

2.1.26 **"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.

2.1.27 **"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.

2.1.28 **"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.

2.1.29 **"Specifications"** shall mean all of the directions, requirements and standards of performance applying to the Work as hereinafter detailed and designated under the Specifications.

2.1.30 **"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, at the site. Wherever the word Subcontractor appears, it shall also mean Sub-Subcontractor.

2.1.31 **"Substantial Completion"** shall mean the written determination by the Commissioner that the Work required under this Contract is substantially, but not entirely, complete.

2.1.32 **"Treasurer"** shall mean the Commissioner of the Department of Finance of the City of New York.

2.1.33 **"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 shall include both Contract Work and Extra Work.

CHAPTER II THE WORK AND ITS PERFORMANCE

ARTICLE 3. CHARACTER OF THE WORK

3.1 Unless otherwise expressly provided in the **Contract Drawings, Specifications and Addenda**, the **Work** shall be performed in accordance with the best modern practice, utilizing, unless otherwise specified in writing, new and unused materials of standard first grade quality and workmanship and design of the highest quality, to the satisfaction of the **Commissioner**.

ARTICLE 4. MEANS AND METHODS OF CONSTRUCTION

4.1 Unless otherwise expressly provided in the **Contract Drawings, Specifications and Addenda**, the **Means and Methods of Construction** shall be such as the **Contractor** may choose; subject, however, to the **Engineer's** right to reject the **Means and Methods of Construction** proposed by the **Contractor** which in the opinion of the **Engineer**:

- 4.1.1 Will constitute or create a hazard to the **Work**, or to persons or property; or
- 4.1.2 Will not produce finished **Work** in accordance with the terms of the **Contract**; or
- 4.1.3 Will be detrimental to the overall progress of the **Project**.

4.2 The **Engineer's** approval of the **Contractor's Means and Methods of Construction**, or his/her failure to exercise his/her right to reject such means or methods, shall not relieve the **Contractor** of its obligation to complete the **Work** as provided in this **Contract**; nor shall the exercise of such right to reject create a cause of action for damages.

ARTICLE 5. COMPLIANCE WITH LAWS

5.1 The **Contractor** shall comply with all **Laws** applicable to this **Contract** and to the **Work** to be done hereunder.

5.2 **Procurement Policy Board Rules:** This **Contract** is subject to the Rules of the **PPB** ("**PPB Rules**") in effect at the time of the bid opening for this **Contract**. In the event of a conflict between the **PPB Rules** and a provision of this **Contract**, the **PPB Rules** shall take precedence.

5.3 **Noise control code provisions.**

5.3.1 In accordance with the provisions of Section 24-216(b) of the Administrative Code of the City ("**Administrative Code**"), **Noise Abatement Contract Compliance**, devices and activities which will be operated, conducted, constructed or manufactured pursuant to this **Contract** and which are subject to the provisions of the **City Noise Control Code** shall be operated, conducted, constructed, or manufactured without causing a violation of the **Administrative Code**. Such devices and activities shall incorporate advances in the art of noise control development for the kind and level of noise

emitted or produced by such devices and activities, in accordance with regulations issued by the Commissioner of the Department of Environmental Protection.

5.3.2 The Contractor agrees to comply with Section 24-219 of the Administrative Code of the City ("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 work 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 New York City Department of Environmental Protection. In addition, the Contractor's certified Construction Noise Mitigation Plan is subject inspection by the Department of Environmental Protection in accordance with 15 RCNY §28-101. No Contract work may take place at a worksite 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 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 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.

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 to fulfill the requirements of this Article 5.4.2, where the Commissioner of the New York 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 City agencies and Contractors. Any such determination shall expire after six months unless renewed.

5.4.2(c) Contractors shall not be required to comply with this Article 5.4.2 where the 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 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 is available. Any finding made pursuant to this subdivision shall expire after sixty days, at which time the requirements of this Article 5.4.2 shall be in full force and effect unless the 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 Agency issuing this solicitation.

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 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 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 calendar 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)(1) Where the 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 those paragraphs is unavailable for such vehicle, Contractor shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle.

5.4.3(d)(2) 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, 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)(3) In determining which technology to use for the purposes of Articles 5.4.3(d)(1) and 5.4.3(d)(2) above, 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)(4) Contractors 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 Agency issuing the solicitation. Any finding or waiver made or issued pursuant to Articles 5.4.3(d)(1) and 5.4.3(d)(2) above shall expire after one hundred eighty days, at which time the requirements of Article 5.4.3(a) shall be in full force and effect unless the 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. Contractors 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) 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 and ten thousand 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 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 Department the following information:

5.4.6(1) The total number of diesel-powered Nonroad Vehicles used to fulfill the requirements of this Public Works Contract;

5.4.6(2) The number of such Nonroad Vehicles that were powered by Ultra Low Sulfur Diesel Fuel;

5.4.6(3) 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(4) 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(5) The locations where such Nonroad Vehicles were used; and

5.4.6(6) 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.

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 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 of New York 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 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 terms shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five horsepower 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.

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 horsepower (HP) rating of 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.

ARTICLE 6. INSPECTION

6.1 During the progress of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall at all times afford the representatives of the **City** every reasonable, safe and proper facility for inspecting all **Work** done or being done at the **Site** and also for inspecting the manufacture or preparation of materials and equipment at the place of such manufacture or preparation.

6.2 The **Contractor's** obligation hereunder shall include the uncovering or taking down of finished **Work** and its restoration thereafter; provided, however, that the order to uncover, take down and restore shall be in writing, and further provided that if **Work** thus exposed proves satisfactory, and if the **Contractor** has complied with Article 6.1, such uncovering or taking down and restoration shall be considered an item of **Extra Work** to be paid for in accordance with the provisions of Article 26. If the **Work** thus exposed proves unsatisfactory, the **City** has no obligation to compensate the **Contractor** for the uncovering, taking down or restoration.

6.3 Inspection and approval by the **Commissioner**, the **Engineer**, **Project Manager**, or **Resident Engineer**, of finished **Work** or of **Work** being performed, or of materials and equipment at the place of manufacture or preparation, shall not relieve the **Contractor** of its obligation to perform the **Work** in strict accordance with the **Contract**. Finished or unfinished **Work** not found to be in strict accordance with the **Contract** shall be replaced as directed by the **Engineer**, even though such **Work** may have been previously approved and paid for. Such corrective work is **Contract Work** and shall not be deemed **Extra Work**.

6.4 Rejected **Work** and materials shall be promptly taken down and removed from the **Site**, which must at all times be kept in a reasonably clean and neat condition.

**ARTICLE 7. PROTECTION OF WORK AND OF PERSONS
AND PROPERTY; NOTICES AND INDEMNIFICATION**

7.1 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall be under an absolute obligation to protect the finished and unfinished **Work** against any damage, loss, injury, theft and/or vandalism and in the event of such damage, loss, injury, theft and/or vandalism, it shall promptly replace and/or repair such **Work** at the **Contractor's** sole cost and expense, as directed by the **Resident Engineer**. The obligation to deliver finished **Work** in strict accordance with the **Contract** prior to **Final Acceptance** shall be absolute and shall not be affected by the **Resident Engineer's** approval of, or failure to prohibit, the **Means and Methods of Construction** used by the **Contractor**.

7.2 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall take all reasonable precautions to protect the persons and 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 notify in writing the commercial general liability insurance carrier, and, where applicable, the worker's compensation and/or other insurance carrier, of any such loss, damage, injury, or accident, and any claim or suit arising therefrom, immediately, but not later than 20 days after such event. The **Contractor's** notice to the commercial general liability insurance carrier must expressly specify that "this notice is being given on behalf of the City of New York as Additional Insured as well as [the Contractor] as Named Insured." The **Contractor's** notice to the insurance carrier shall contain the following information: the name of the **Contractor**, the number of the **Contract**, the date of the occurrence, the location (street address and borough) of the occurrence, and the identity of the persons or things injured, damaged or lost.

7.3.2(a) At the time notice is provided to the insurance carrier(s), the **Contractor** shall provide copies of such notice to the **Comptroller** and the **Commissioner**. Notice to the **Comptroller** shall be sent to the Insurance Unit, NYC Comptroller's Office, 1 Centre Street – Room 1222, New York, New York, 10007. Notice to the **Commissioner** shall be sent to the address set forth in Schedule A of the General Conditions.

7.3.2(b) If the **Contractor** fails to provide any of the foregoing notices to any appropriate insurance carrier(s) in a timely and complete manner, the **Contractor** shall indemnify the **City** for all losses, judgments, settlements and expenses, including reasonable attorneys' fees, arising from an insurer's disclaimer of coverage citing late notice by or on behalf of the **City**.

7.4 To the fullest extent permitted by law, the **Contractor** shall indemnify, defend and hold the **City**, its employees and agents (the "Indemnitees") harmless against any and all claims (including but not limited to claims asserted by any employee of the **Contractor** and/or its **Subcontractors**) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys' fees and disbursements) allegedly arising out of or in any way related to the operations of the **Contractor** and/or its **Subcontractors** in the performance of this **Contract** or from the **Contractor's** and/or its **Subcontractors'** failure to comply with any of the provisions of this **Contract** or of the **Law**. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Article 7.4 by way of cross-claim, third-party

claim, declaratory action or otherwise. The parties expressly agree that the indemnification obligation hereunder contemplates (1) full indemnity in the event of liability imposed against the Indemnitees without negligence and solely by reason of statute, operation of law or otherwise; and (2) partial indemnity in the event of any actual negligence on the part of the Indemnitees either causing or contributing to the underlying claim (in which case, indemnification will be limited to any liability imposed over and above that percentage attributable to actual fault whether by statute, by operation of law, or otherwise). Where partial indemnity is provided hereunder, all costs and expenses shall be indemnified on a pro rata basis.

7.4.1 Indemnification under Article 7.4 or any other provision of the **Contract** shall operate whether or not **Contractor** or its **Subcontractors** have placed and maintained the insurance specified under Article 22.

7.5 The **Contractor** waives all rights against the **City** for any damages or losses for which either is covered under any insurance required under Article 22 (whether or not such insurance is actually procured) or any other insurance applicable to the operations of the **Contractor** and/or its **Subcontractors** in the performance of this **Contract**.

7.6 The provisions of this Article 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 **Work** on the date specified in a written notice signed by the **Commissioner**. The time for performance of the **Work** under the **Contract** shall be computed from the date specified in such written notice. **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 herein, 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** with this **Contract**, unless otherwise directed by the **Engineer**, shall submit to the **Engineer** a proposed progress schedule in the form of a bar graph or in such other form as specified by the **Engineer**, and monthly cash flow requirements, showing:

9.1.1 The anticipated time of commencement and completion of each of the various operations to be performed under this **Contract**; and

9.1.2 The sequence and interrelation of each of these operations with the others and with those of other related **Contracts**; and

9.1.3 The estimated time required for fabrication or delivery, or both, of all materials and equipment required for the **Work**; 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** 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 enable 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 seven (7) **Days** after the commencement of such condition, the **Contractor** must notify the **Engineer** 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.

11.1.2 If the **Contractor** shall claim to be sustaining damages for delay as provided for in this Article, within forty-five (45) **Days** from the time such damages are first incurred, and every thirty (30) **Days** thereafter for as long as such damages are being incurred, the **Contractor** shall submit to the **Commissioner** verified written statements of the details and the amounts of such damages, together with documentary evidence of such damages, ("statement of delay damages") as further detailed in Section 11.6. 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. On failure of the **Contractor** to fully comply with all of 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 arising under or by reason of this **Contract** shall not be different from or in excess of the statements made and documentation provided pursuant to this article.

11.1.3 Within 60 days of submission of the final verified statement of claims pursuant to Article 44, the **Commissioner** shall make a determination as to whether a compensable

delay has occurred and, if so, the amount of compensation due the **Contractor**. Notwithstanding the above, the **Commissioner** may make a determination as to whether a compensable delay has occurred at any time after the **Contractor's** first submission of a statement of delay damages.

11.2 Failure of the **Contractor** to strictly comply with the requirements of Article 11.1.1 may, in the discretion of the **Commissioner**, be deemed sufficient cause to deny any extension of time on account of delay arising out of such condition. Failure of the **Contractor** to strictly comply with the requirements of Articles 11.1.1 and 11.1.2 shall be deemed a conclusive waiver by the **Contractor** of any and all claims for damages for delay arising from such condition and no right to recover on such claims shall exist.

11.3 When appropriate and directed by the **Engineer**, the progress schedule shall be revised by the **Contractor** until finally approved by the **Engineer**. The revised progress schedule must be strictly adhered to by the **Contractor**.

11.4 Compensable Delays

11.4.1 The **Contractor** agrees to make claim only for additional costs attributable to delay in the performance of this **Contract** necessarily extending the time for completion of the **Work** or resulting from acceleration directed by the City and required to maintain the project 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**, 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 Extended delays attributable to the **City** in the review or issuance of change orders, in shop drawing reviews and approvals or as a result of the cumulative impact of multiple change orders, which have a verifiable impact on project costs.

11.4.1.3 The unavailability of the site for an extended period of time that significantly affects the scheduled completion of the **contract**.

11.4.1.4 The issuance by the **Engineer** of a stop work order relative to a substantial portion of work for a period exceeding thirty days, that was not brought about through any action or omission of the **Contractor**.

11.4.1.5 Differing site conditions that were not known or 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 The provisions of this Article 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 section shall be allowed.

11.5 Non-Compensable Delays. The **Contractor** agrees to make no monetary request for, and has 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 generally recognized 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 action or omission by the **City**;

11.5.4 Any labor boycott, strike, picketing or similar situation;

11.5.5 Any shortages of supplies of materials 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 war or of the public enemy or terrorist acts;

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 dates of the claimed periods of delay and, in addition, a description of the operations that were delayed, the reasons for the delay and an explanation of how they were delayed.

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 amount of additional compensation sought and a breakdown of that amount into categories as described in Article 26.2, subject to the limitations set forth in section 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 Labor;

11.7.1.2 Materials;

11.7.1.3 Equipment;

- 11.7.1.4 Extended Field Office Costs;
- 11.7.1.5 Extended Contract Site Overhead;
- 11.7.1.6 Extended Home office overhead; and
- 11.7.1.7 Insurance and Bond Costs.

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 11.7.1.1 through 11.7.1.6, and an additional overhead of 5% of the costs outlined in 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;
- 11.7.3.2 Consequential damages, including but not limited to interest on monies in dispute, including interest which is paid on such monies, 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;
- 11.7.3.4 Direct or indirect costs attributable to performance of work where the **Contractor**, because of situations or conditions within its control, has not progressed the work in a satisfactory manner; and
- 11.7.3.5 Attorneys' fees and dispute and claims preparation expenses.

11.8 Determinations 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 If the parties agree that a compensable delay has occurred and agree on the amount of compensation, payment may be made pursuant to a written change order, subject to pre-audit by the **Engineering Audit Officer**, and may be post-audited by the **Comptroller** and/or the **Department**.

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** shall determine 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. Except as provided for in Article 11.4.1.1, the **Contractor** agrees to make no claim against the **City** for

any damages relating to or arising out of any timely directions issued by the **Engineer** pursuant to this article (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 this **Contractor's** failure to comply with the **Engineer's** direction 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 **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 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 suit based upon such claim and if any judgment or claims (even if the allegations of the suit 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 and the **PPB Rules**.

13.2 Any extension of time may be granted only by the **Commissioner** 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 officers, 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 **Commissioner** 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 **Commissioner** or the Board, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the **Contractor** or of its **Subcontractors** or **Materialmen**, and would of itself (irrespective of the concurrent causes) have delayed the **Work**, no extension of time will be allowed for the period of delay resulting from such act, fault or omission.

13.5 The determination made by the **Commissioner** or the Board on an application for an extension of time shall be binding and conclusive on the **Contractor**.

13.6 The granting of an application for an extension of time for causes of delay other than those herein referred to shall be entirely within the discretion of the **Commissioner** or the Board.

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 **Commissioner** of the condition which allegedly has caused or is causing the delay, and shall submit a written application to the **Commissioner** 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 bid amount;

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 **Commissioner** who may, for good and sufficient cause, extend the time for the performance of the **Contract** as follows:

13.9.1(a) If the **Work** is to be completed within six (6) months, the time for performance may be extended for sixty (60) **Days**;

13.9.1(b) If the **Work** is to be completed within less than one (1) year but more than six (6) months, an extension of ninety (90) **Days** may be granted;

13.9.1(c) If the **Contract** period exceeds one (1) year, besides the extension granted in Article 13.9.1(b), an additional thirty (30) **Days** may be granted for each multiple of six (6) months involved beyond the one (1) year period; or

13.9.1(d) If exceptional circumstances exist, the **Commissioner** 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 **Commissioner** 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 **Commissioner**, 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 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** except as set forth in Article 11, and agrees that all it may be entitled to on account of any such delay for which compensation is not specifically provided for in Article 11 is an extension of time to complete performance of the **Work** as provided herein.

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 in Articles 14.2.1 and 14.2.2 have been met. The **Commissioner** will then issue a Certificate of **Substantial Completion**.

14.2.1 **Inspection:** The **Engineer** has inspected the **Work** and has made a written determination that it is substantially complete.

14.2.2 **Approval of Final Punch List and Date for Final Acceptance:** Following inspection of the **Work**, the **Engineer** shall furnish the **Contractor** a final punch list, specifying all items of **Work** to be completed. The **Contractor** shall then submit to the **Engineer** dates for the completion of each specified item of **Work**. Within a reasonable time after receipt, the **Engineer**, in a written notification to the **Contractor**, shall approve the **Contractor's** completion dates or, if they are unable to agree, 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 **Determining the Date of Final Acceptance:** The **Work** will be accepted as final and complete as of the date of the **Engineer's** inspection if, upon such inspection, the **Engineer** finds that all items on the **Final Approved Punch List** are complete and no further **Work** remains to be done. The **Commissioner** will then issue a written determination of **Final Acceptance**.

14.4 **Request for Inspection:** Inspection of the **Work** by the **Engineer** for the purpose of **Substantial Completion** or **Final Acceptance** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.5 **Request for Re-inspection:** If upon inspection for the purpose of **Substantial Completion** or **Final Acceptance**, the **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** 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** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.6 **Initiation of Inspection by the 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** may initiate such inspection or re-inspection.

ARTICLE 15. LIQUIDATED DAMAGES

15.1 In the event the **Contractor** fails to complete the **Work** within the time fixed for such 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 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 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 shall apply to the **Contractor** if it 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** 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 this article. In the event the **Commissioner** takes over, uses, occupies, or operates any part of the **Work**:

16.1.1 the **Commissioner** 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, 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 If an approved **Subcontractor** elects to subcontract any portion of its subcontract, the proposed subcontract shall be submitted in the same manner as directed above.

17.4 The **Commissioner** will notify the **Contractor** in writing whether the proposed **Subcontractor** is qualified or not qualified. If the proposed **Subcontractor** is not qualified, the **Contractor** may submit another proposed **Subcontractor** unless the **Contractor** decides to do the **Work**. No **Subcontractor** shall be permitted on the **Site** unless approved.

17.5 Before entering into any subcontract hereunder, the **Contractor** shall inform the **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**.

17.6 Documents given to a **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.

17.7 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.

17.8 The **Contractor** shall be responsible for ensuring that all **Subcontractors** performing **Work** at the **Site** have either their own insurance coverage or are covered by the **Contractor's** insurance as required by Article 22.

17.9 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:

17.9.1 **Payment to Subcontractors:** The agreement between the **Contractor** and its **Subcontractors** 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**.

17.9.2 **Prevailing Rate of Wages:** The agreement between the **Contractor** and its **Subcontractors** shall include the prevailing wage rates and supplemental benefits to be paid in accordance with Labor Law Section 220.

17.9.3 **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 its **Subcontractors** in excess of \$50,000 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.).

17.10 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 adjusted.

17.11 On **Contracts** where 100% 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.

17.12 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, or conveyance shall not be valid until filed in the office of the **Commissioner** and the **Treasurer**, 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 or conveyance, 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 GUARANTY**

ARTICLE 19. SECURITY DEPOSIT

19.1 The bid deposit, if required, shall be retained by the **Comptroller** as security for the **Contractor's** faithful performance of the **Contract** and will be returned to the **Contractor** only after the sum retained under Article 21 equals the amount of the bid deposit, subject to the other provisions of this **Contract**. If performance and payment bonds are required, any bid security posted shall be returned within a reasonable time after posting of such bonds and execution of this **Contract** by the **City**. When no partial payments are provided, the bid deposit will be released when final payment is certified to the **Comptroller** for payment.

19.2 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**:

19.2.1 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

19.2.2 To indemnify the **City** against any and all claims.

ARTICLE 20. PAYMENT GUARANTEE

20.1 On **Contracts** where 100% performance bonds and payment bonds are executed, this article does not apply.

20.2 In the event the terms of this **Contract** do not require the **Contractor** to provide a payment bond, the **City** shall, in accordance with the terms of this article, guarantee payment of all lawful demands 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 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 this Article 20.3.

20.3.2 Nothing in this article 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**.

20.3.3 All demands made against the **City** pursuant to this article shall be made within four (4) months from the date payment is due on the invoice or invoices submitted by the beneficiary to the **Contractor** for labor or **Work** done or for materials or supplies delivered, or, if the demand is for wages, four (4) months from the date the wages were due to be paid to the beneficiary.

20.3.4 All demands made against the **City** by such beneficiary shall be presented to the **Engineer** along with all written documentation concerning the demand which the **Engineer** deems 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.

20.3.5 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.

20.3.6 The **City** will not initiate the payment process of this article or make payment on a demand where the beneficiary making the demand has filed a lien against the **Work** or otherwise sues the **City** prior to receiving a written notice from the **City** that it will not pay the demand.

20.3.7 No beneficiary shall be entitled to interest from the **City**, or to any other costs, including, but not limited to, attorney's fees.

20.4 Upon the receipt by the **City** of a demand pursuant to this article, 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.

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**.

20.4.2 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 lien has been filed, the terms and conditions set forth in Article 23 shall apply.

20.5 The provisions of this article 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, 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 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 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 his **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 within the one year limitations period set forth in Section 137(4)(b).

ARTICLE 21. RETAINED PERCENTAGE

21.1 If this **Contract** requires 100% 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 100% performance and payment security and if the price for which this **Contract** was awarded does not exceed \$500,000, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, ten (10%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.3 If this **Contract** does not require 100% performance and payment security and if the price for which this **Contract** was awarded exceeds \$500,000, 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: 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**), the **Contractor** shall effect 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 issued by companies that meet the standards of Article 22.2.1 and shall be primary (and non-contributing) to any insurance or self-insurance maintained by the **City**.

22.1.1 Commercial General Liability Insurance: The **Contractor** shall provide a Commercial General Liability Insurance policy covering the **Contractor** as Named Insured and the **City** as an Additional Insured. This policy shall protect the **City** and the **Contractor** from claims for property damage and/or bodily injury, including death, which may arise from any of the operations under this **Contract**. Coverage under this policy shall be at least as broad as that provided by ISO Form CG 0001 (10/01 ed.), must be "occurrence" based rather than "claims-made", and shall 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, Medical Payments, Independent Contractors, Personal Injury (Contractual Exclusion deleted), Explosion, Collapse and Underground Property, and Incidental Malpractice. If such insurance contains an aggregate limit, it shall apply separately to this **Project**.

22.1.1(a) Such Commercial General Liability Insurance shall name the City, together with its officials and employees, as an Additional Insured under this policy. Coverage for the City as Additional Insured shall specifically include the City's officials and employees, and shall be at least as broad as either Insurance Services Office ("ISO") Form CG 20 10 (07/04 ed.) or Form CG 20 33 (07/04 ed.) and shall provide completed operations coverage at least as broad as CG 20 37 (07/04 ed.).

22.1.1(b) If this Contract is equal to or greater than Ten Million Dollars (\$10,000,000.00), each Commercial General Liability Insurance policy provided shall contain each of the following endorsements:

22.1.1(b)(i) The Duties in the Event of Occurrence, Claim or Suit condition of the policy is amended per the following: If and insofar as knowledge of an "occurrence", "claim", or "suit" is relevant to the City of New York as Additional Insured under this policy, such knowledge by an agent, servant, official, or employee of the City of New York will not be considered knowledge on the part of the City of New York of the "occurrence", "claim", or "suit" unless the following position shall have received notice thereof from such agent, servant, official, or employee: Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department; and

22.1.1(b)(ii) Any notice, demand or other writing by or on behalf of the Named Insured to the Insurance Company shall also be deemed to be a notice, demand, or other writing on behalf of the City as Additional Insured. Any response by the Insurance Company to such notice, demand or other writing shall be addressed to Named Insured and to the City at the following addresses: Insurance Unit, NYC Comptroller's Office, 1 Centre Street - Room 1222, New York, N.Y. 10007; and Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, NY 10007.

22.1.2 Workers' Compensation Insurance and Disability Benefits Insurance: The Contractor shall provide, and ensure that each Subcontractor provides, Workers Compensation 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 qualifying for insurance pursuant to Article 22.1.4).

22.1.3 Employers' Liability Insurance: The Contractor shall provide, and ensure that each Subcontractor provides, Employers Liability Insurance affording compensation due to bodily injury by accident or disease sustained by any employee arising out of and in the course of his/her employment under this Contract (except for those qualifying for insurance pursuant to Article 22.1.4).

22.1.4 United States Longshoremen's and Harbor Workers Act and/or Jones Act Insurance: The Contractor shall provide, and ensure that each Subcontractor provides, 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.

22.1.5 Builders' Risk Insurance: The Contractor shall provide a Builders' Risk Insurance policy covering all risks in completed value form. Such policy shall cover the total value of the Work performed in accordance with Schedule A, as well as the value of any equipment, supplies and/or material for the Project that may be in storage (on or off the Site) or in transit. The policy shall cover the cost of removing debris, including demolition as may be legally necessary by the operation of any law, ordinance or regulation, and for loss or damage to any owned, borrowed, leased or rented capital equipment, tools, including tools of their agents and employees, staging towers and forms,

and property of the City held in their care, custody and/or control. Such policy shall name as insureds the City, the Contractor, and its Subcontractors. The Builders' Risk policy shall contain the following endorsements:

22.1.5(a) The City and the Contractor shall be named as loss payee for the Work in order of precedence, as their interest may appear; and

22.1.5(b) In the event the loss occurs at an occupied facility, the policy shall permit occupancy without the consent of the Insurance Company; and

22.1.5(c) In the event that the insurance policy has been issued by a mutual insurance company, the following language shall be included: "The City of New York is not liable for any premium or assessment under this policy of insurance. The First Named Insured is solely liable therefor."

22.1.6 Comprehensive Business Automobile Liability Insurance: The Contractor shall provide a Comprehensive Business Automobile Liability policy for liability arising out of any owned, non-owned, leased and hired vehicles to be used in connection with this Contract. Coverage should be at least as broad as ISO Form CA0001, ed. 10/01.

22.1.6(a) If autos 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.

22.1.7 Pollution/Environmental Liability Insurance: The Contractor shall provide Pollution/Environmental Liability Insurance covering bodily injury and property damage, including loss of use of damaged property or of property that has not been physically injured. 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, suit, or proceedings against the City arising from the operations under this Contract. Such insurance shall be in the Contractor's name and list the City as an Additional Insured. Coverage for the City as Additional Insured shall specifically include the City's officials and employees, and shall be at least as broad as provided to the Contractor for this Project.

22.1.7(a) If such coverage 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 years from the time the Work under this Contract is completed.

22.1.8 Marine Insurance:

22.1.8(a) Marine Protection and Indemnity Insurance: The Contractor shall provide a Marine Protection and Indemnity policy with coverage at least as broad as policy form SP-23. The policy shall provide coverage for the Contractor and for the City (together with its officials and employees) as Additional Insured for bodily injury and property damage arising from marine operations under this Contract including injury or death of crew members (if not fully provided through other insurance), damage to piers, wharves and other fixed or movable structures and loss of or damage to any other vessel or craft, or to property on such other vessel or craft, not caused by collision.

22.1.8(b) Ship Repairers Legal Liability Insurance: The Contractor shall provide a Ship Repairers Legal Liability Insurance policy covering all repair operations under this Contract at

or in the vicinity of a designated approved port or yard under this **Contract**. The policy shall provide coverage from the point of acceptance of care custody and control of any **City** vessel. The policy shall provide Bailee Coverage for any **City** vessel in the **Contractor's** care, custody and control and coverage for damage to property of others caused by any **City** vessel in the **Contractor's** care custody and control.

22.1.8(c) Collision Liability/Towers Liability Insurance: The **Contractor** shall provide a Collision Liability/Towers Liability Insurance policy with coverage for the **Contractor** and for the **City** (together with its officials and employees) as Additional Insured at least as broad as the American Institute Tug Form (08/01/76) for all tugs used under this **Contract** and Collision Liability per American Institute Hull Clauses (6/2/77).

22.1.8(d) Marine Pollution Liability Insurance: The **Contractor** shall provide a Marine Pollution Liability Insurance policy covering itself as Named Insured and the **City** (together with its officials and employees) as Additional Insured for liability arising from the discharge or substantial threat of a discharge of oil, or from the release or threatened release of a hazardous substance including injury to, or economic losses resulting from, the destruction of or damage to real property, personal property or natural resources. Coverage under this policy shall be at least as broad as that provided by Water Quality Insurance Syndicate Form (09/98 ed.).

22.1.9 The **Contractor** shall provide such other types of insurance, at such minimum limits, as are specified in Schedule A of the General Conditions.

22.2 General Requirements for Insurance 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 AA, unless prior written approval is obtained from the Mayor's Office of Operations.

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 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 All required insurance policies, except for insurance required pursuant to Sections 22.1.2, 22.1.3, and 22.1.4, shall contain the following endorsement: "This policy may not be cancelled, terminated, modified or changed unless thirty (30) days prior written notice is sent by the Insurance Company to the Named Insured (or First Named Insured, as appropriate), the **Commissioner**, and to the **Comptroller**, attn: Office of Contract Administration, Municipal Building, Room 1005, New York, New York 10007."

22.3 Proof of Insurance:

22.3.1 Within ten (10) **Days** of award, the **Contractor** shall, for each policy required under this **Contract**, except for Workers Compensation Insurance and Disability Benefits Insurance and builders' risk insurance, file a Certificate of Insurance with the **Commissioner** pursuant to Article 22.6. For Workers' Compensation Insurance and Disability Benefits Insurance, the **Contractor** shall file proof of insurance in a form acceptable to the **Commissioner** within ten (10) **Days** of award. Accord forms are not acceptable proof of workers' compensation coverage. The Contractor must submit one of the following forms to the Department, or another form acceptable to the Department: C-105.2 -- Certificate of Workers' Compensation Insurance, or U-26.3 -- State Insurance Fund Certificate of Workers' Compensation Insurance. For builders' risk insurance, the **Contractor** shall file a Certificate of Insurance with the **Commissioner** at the direction of the **Commissioner** but in any event no later than ten (10) **Days** prior to commencement of the **Work**.

22.3.1(a) All Certificates of Insurance shall be in a form acceptable to the **City** and shall certify the issuance and effectiveness of the types of insurance specified in Schedule A, each with the specified minimum limits and evidence of the compliance with the Additional Insured or Named Insured provisions of Articles 22.1.1(a), 22.1.5, 22.1.7, and 22.1.8, as applicable. All Certificate(s) of Insurance shall be accompanied by either a duly executed "Certification by Broker" in the form contained in Part II of Schedule A or completed copies of all policies referenced in the Certificate of Insurance. In the absence of completed policies, binders are acceptable.

22.3.2 Certificates of Insurance confirming renewals of insurance shall be submitted to the **Commissioner** prior to the expiration date of coverage of policies required under this **Contract**. Such Certificates of Insurance shall comply with the requirements of Article 22.3.1(a) and, if applicable, Article 22.3.1(b).

22.3.3 The **Contractor** shall be obligated to provide the **City** with a copy of any policy required by this Article 22 upon the demand for such policy by the **Commissioner** or the New York City Law Department.

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 hereunder does not excuse the **Contractor** from securing a policy consistent with all provisions of this Article or of any liability arising from its failure to do so.

22.4.2 The **Contractor** shall be responsible for providing continuous insurance coverage in the manner, form, and limits required by this **Contract** and shall be authorized to perform **Work** only during the effective period of all required coverage.

22.4.3 In the event that any of the required insurance policies lapse, are revoked, suspended or otherwise terminated, for whatever cause, the **Contractor** shall immediately stop all **Work**, and shall not recommence **Work** until authorized in writing to do so by the **Commissioner**. Upon quitting the **Site**, except as otherwise directed by the **Commissioner**, the **Contractor** shall leave all plant, materials, equipment, tools and supplies on the **Site**. **Contract** time shall continue to run during such periods and no extensions of time will be granted. The **Commissioner** may also declare the **Contractor** in default for failure to maintain required insurance.

22.5 The **City** as Additional Insured or Loss Payee under **Subcontractors'** Insurance. The Contractor shall ensure that each **Subcontractor** name the **City** as Additional Insured or loss payee, as appropriate, under all

policies covering **Work** performed by such **Subcontractor** under this **Contract**. The **City's** coverage as **Additional Insured** shall include the **City's** officials and employees and be at least as broad as that provided to the **Contractor**. The foregoing requirements shall not apply to insurance provided pursuant to Articles 22.1.2, 22.1.3, and 22.1.4.

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 If the **Contract** involves disposal of hazardous materials, the **Contractor** shall dispose such materials only at sites where the disposal site operator maintains Pollution Legal Liability Insurance in the amount of at least \$2,000,000 for losses arising from such disposal site.

22.8 **Materiality/Non-Waiver:** The **Contractor's** failure to secure policy(ies) in complete conformity with this Article, or to give the Insurance Company timely notice of any sort required in this **Contract** on behalf of the **City**, or to do anything else required by this Article 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.

22.9 **Other Remedies:** Insurance coverage in the minimum amounts provided for herein shall not relieve the **Contractor** or **Subcontractors** of any liability under this **Contract**, nor shall it preclude the **City** from exercising any rights or taking such other actions as are available to it under any other provisions of this **Contract** or **Law**.

ARTICLE 23. MONEY RETAINED AGAINST CLAIMS

23.1 If any claim shall be made by any person or entity (including **Other Contractors** with the **City** on this **Project**) against the **City** or against the **Contractor** and the **City** for any of the following:

(a) An alleged loss, damage, injury, theft or vandalism of any of the kinds referred to in Articles 7 and 12, plus the reasonable costs of defending the **City**, which in the opinion of the **Comptroller** may not be paid by an insurance company (for any reason whatsoever); or

(b) An infringement of copyrights, patents or use of patented articles, tools, etc., as referred to in Article 57; or

(c) Damage claimed to have been caused directly or indirectly by the failure of the **Contractor** to perform the **Work** in strict accordance with this **Contract**,

the amount of such claim, or so much thereof as the **Comptroller** may deem necessary, may be withheld by the **Comptroller**, as security against such claim, from any money due hereunder. The **Comptroller**, in his/her discretion, may permit the **Contractor** to substitute other satisfactory security in lieu of the monies so withheld.

23.2 If an action on such claim is timely commenced and the liability of the **City**, or the **Contractor**, or both, shall have been established therein by a final judgment of a Court of competent jurisdiction, or if such claim shall have been admitted by the **Contractor** to be valid, the **Comptroller** shall pay such judgment or admitted claim out of the monies retained by the **Comptroller** under the provisions of this article, and return the balance, if any, without interest, to the **Contractor**.

23.3 **Liens:** If at any time before or within thirty (30) **Days** after the **Work** is completed and accepted by the **City**, any persons claiming to have performed any labor or furnished any material toward the performance or completion of this **Contract**, shall file with the **Agency** and with the **Treasurer** any notice as is described in the

New York State Lien Law, or any act of the Legislature of the State of New York, the City shall retain, from the monies due or to become due under this Contract, so much of such monies as shall be sufficient to pay the amount claimed in said notice, together with the reasonable costs of any action or actions brought or that may be brought to enforce such lien. The monies so retained shall be held by the City until the lien thereon created by the said act and the filing of the said notice shall be discharged pursuant to Law.

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 guarantee are provided for.

24.2 As security for the faithful performance of its obligations hereunder, the Contractor, upon filing its requisition for payment on Substantial Completion, shall deposit with the Commissioner a sum equal to one (1%) percent of the price (or the amount fixed in Schedule A of the General Conditions) in cash or certified check upon a state or national bank and trust company or a check of such bank and trust company signed by a duly authorized officer thereof and drawn to the order of the Comptroller, or obligations of the City, which the Comptroller may approve as of equal value with the sum so required.

24.3 In lieu of the above, the Contractor may make such security payment to the City by authorizing the Commissioner in writing to deduct the amount from the Substantial Completion payment which shall be deemed the deposit required above.

24.4 If the Contractor has faithfully performed all of its obligations hereunder the Commissioner shall so certify to the Comptroller within five (5) Days after the expiration of one (1) year from the date of Substantial Completion and acceptance of the Work or within thirty (30) Days after the expiration of the guarantee period fixed in the Specifications. The security payment shall be repaid to the Contractor without interest within thirty (30) Days after certification by the Commissioner to the Comptroller that the Contractor has faithfully performed all of its obligations hereunder.

24.5 Notice by the Commissioner to the Contractor to repair, replace, rebuild or restore such defective or damaged Work shall be timely, pursuant to this article, if given not later than ten (10) Days subsequent to the expiration of the one (1) year period or other periods provided for herein.

24.6 If the Contractor shall fail to repair, replace, rebuild or restore such defective or damaged Work promptly after receiving such notice, the Commissioner shall have the right to have the Work done by others in the same manner as provided for in the completion of a defaulted Contract, under Article 51.

24.7 If the security payment so deposited is insufficient to cover the cost of such Work, the Contractor shall be liable to pay such deficiency on demand by the Commissioner.

24.8 The Engineer's certificate setting forth the fair and reasonable cost of repairing, replacing, rebuilding or restoring any damaged or defective Work when performed by one other than the Contractor, shall be binding and conclusive upon the Contractor as to the amount thereof.

24.9 The Contractor shall obtain all manufacturers' warranties and guaranties of all equipment and materials required by this Contract in the name of the City and shall deliver same to the Commissioner. All of the City's rights and title and interest in and to said manufacturers' warranties and guaranties may be assigned by the City to any subsequent purchasers or lessees of the premises.

**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 **Laws** and this **Contract**. All such changes, modifications and amendments will become a part of the **Contract**. **Work** so ordered shall be performed by the **Contractor**.

25.2 **Contract** changes will be made only for **Work** necessary to complete the **Work** included in the original scope of the **Contract** and/or for non-material changes to the scope of the **Contract**. Changes are not permitted for any material alteration in the scope of **Work** in the **Contract**.

25.3 The **Contractor** shall be entitled to a price adjustment for **Extra Work** performed pursuant to a written change order. Adjustments to price shall be computed in one or more of the following ways:

25.3.1 By applicable unit prices specified in the **Contract**; and/or

25.3.2 By agreement of a fixed price; and/or

25.3.3 By time and material records; and/or

25.3.4 In any other manner approved by the **CCPO**.

25.4 All payments for change orders are subject to pre-audit by the **Engineering Audit Officer** and may be post-audited by the **Comptroller** and/or the **Department**.

ARTICLE 26. METHODS OF PAYMENT FOR OVERRUNS AND EXTRA WORK

26.1 **Overrun of Unit Price Item**: An overrun is any quantity of a unit price item which the **Contractor** is directed to provide which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule.

26.1.1 For any unit price item, the **Contractor** will be paid at the unit price bid for any quantity up to one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule. If during the progress of the **Work**, the actual quantity of any unit price item required to complete the **Work** approaches the estimated quantity for that item, and for any reason it appears that the actual quantity of any unit price item necessary to complete the **Work** will exceed the estimated quantity for that item by twenty-five (25%) percent, the **Contractor** shall immediately notify the **Engineer** of such anticipated overrun. The **Contractor** shall not be compensated for any quantity of a unit price item provided which is in excess of one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule without written authorization from the **Engineer**.

26.1.2 If the actual quantity of any unit price item necessary to complete the **Work** will exceed one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule, the **City** reserves the right and the **Contractor** agrees to negotiate a new unit price for such item. In no event shall such negotiated new unit price exceed the unit bid price. If the **City** and **Contractor** cannot agree on a new unit price, then the **City** shall order the **Contractor** and the **Contractor** agrees to provide additional quantities of the item on a time and material basis 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 on a time and material basis 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.

26.2.1 Necessary materials (including transportation to the Site); plus

26.2.2 Necessary direct labor, including payroll taxes 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, necessary plant and equipment other than small tools, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per operating hour: $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$. Reasonable rental value is defined as the lower of either seventy-five percent of the monthly prorated rental rates established in "The AED Green Book, Rental Rates and Specifications for Construction Equipment" published by PRIMEDIA (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 PRIMEDIA (the "Blue Book"). The reasonable rental value is 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 percent of such rental rates; second shift shall be sixty percent of the first shift rate; and third shift shall be forty percent of the first shift rate. Equipment on standby shall be reimbursed at one-third the prorated monthly rental rate. **Contractor**-owned equipment includes equipment from rental companies affiliated with or controlled by the **Contractor**, as determined by the **Commissioner**. In establishing cost reimbursement for non-operating contractor-owned 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 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 Reasonable rental costs of non-**Contractor**-owned necessary plant and equipment other than small tools, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per hour of operation: $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$. In lieu of renting, the City reserves the right to direct the purchase of non-operating equipment (scaffolding, sheeting systems, road plates, etc.), with payment on a purchase-salvage/life cycle basis, if less than the projected rental costs; plus

26.2.7 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 shall be based upon the Manual Rate for such insurance for the applicable work classifications/codes, in accordance with the most recent schedule promulgated by the New York Compensation Insurance Rating Board; plus

26.2.8 Additional costs incurred as a result of the **Extra Work** for performance and payment bonds; plus

26.2.9 Ten (10%) 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

26.2.10 Ten (10%) percent of the total of items in Articles 26.2.1 through 26.2.5, plus item 26.2.9, 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

26.2.11 Five (5%) percent of the total of items in Article 26.2.6, 26.2.7, and 26.2.8 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**. The cost of such **Extra Work** and of such omitted or reduced **Work** shall be computed based upon applicable **Contract** unit prices. Where there are no applicable **Contract** unit prices, the cost of such **Extra Work** and of such omitted or reduced **Contract Work** shall be computed in accordance with items 26.2.1 through 26.2.8. If the cost of such **Extra Work** exceeds the costs of such omitted or reduced **Contract Work**, the **Contract** price shall be increased by the difference, plus percentages for overhead and profit as provided in Articles 26.2.9 through 26.2.11. If the cost of the omitted or reduced **Contract Work** exceeds the cost of the **Extra Work**, then the **Contract** price shall be reduced by the difference.

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 that arise under, or by virtue of, this **Contract** shall be finally resolved in accordance with the provisions of this article 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 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 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 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 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, the **Contract** terms shall remain in force and the **Contractor** shall continue to perform **Work** as directed by the **ACCO** or the **Engineer**. Failure of the **Contractor** to continue **Work** as directed shall constitute a waiver by the **Contractor** of its claim.

27.4 Presentation of Disputes to Commissioner.

Notice of Dispute and Agency Response. The **Contractor** shall present its dispute in writing ("Notice of Dispute") to the **Commissioner** within thirty (30) Days of receiving written notice of the determination or action that is the subject of the dispute. This notice requirement shall not be read to replace any other notice requirements contained in the **Contract**. The Notice of Dispute shall include all the facts, evidence, documents, or other basis upon which the **Contractor** relies in support of its position, as well as a detailed computation demonstrating how any amount of money claimed by the **Contractor** in the dispute was arrived at. Within thirty (30) Days after receipt of the detailed written submission comprising the complete Notice of Dispute, the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** shall submit to the **Commissioner** all materials he or she deems pertinent to the dispute. Following initial submissions to the **Commissioner**, either party may demand of the other the production of any document or other material the demanding party believes may be relevant to the dispute. The requested party shall produce all relevant materials that are not otherwise protected by a legal privilege recognized by the courts of New York State. Any question of relevancy shall be determined by the **Commissioner** whose decision shall be final. Willful failure of the **Contractor** to produce any requested material whose relevancy the **Contractor** has not disputed, or whose relevancy has been affirmatively determined, shall constitute a waiver by the **Contractor** of its claim.

27.4.1 **Commissioner Inquiry.** The **Commissioner** shall examine the material and may, in his or her discretion, convene an informal conference with the **Contractor**, the **ACCO**, and the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** to resolve the issue by mutual consent prior to reaching a determination. The **Commissioner** may seek such technical or other expertise as he or she shall deem appropriate, including the use of neutral mediators, and require any such additional material from either or both parties as he or she deems fit. The **Commissioner's** ability to render, and the effect of, a decision hereunder shall not be impaired by any negotiations in connection with the disputed 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 **Contractor** thus brought into the dispute resolution proceeding shall have the same rights and obligations under this article 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 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. 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 **Agency 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 section 7-201 and 7-203 of the New York City 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 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 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;

27.6.1.1 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

27.6.2 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, 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 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 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 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 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 Corporation Counsel, the Director of the Office of Construction, 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 Laws 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.

27.8 Any termination, cancellation, or alleged breach of the **Contract** prior to or during the pendency of any proceedings pursuant to this article 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.

ARTICLE 28. RECORD KEEPING FOR EXTRA OR DISPUTED WORK

28.1 While the **Contractor** or any of its **Subcontractors** is performing **Extra Work** on a Time and Material Basis ordered by the **Commissioner** under Article 25, or is performing **disputed Work**, or complying with a determination or order under protest in accordance with Articles 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 and number of each **Worker** employed on such **Work** or engaged in complying with such determination or order, the number of hours employed, and the character of the **Work** each is doing; and

28.1.2 The nature and quantity of any materials, plant and equipment furnished or used in connection with the performance of such **Work** or compliance with such determination or order, and from whom purchased or rented.

28.2 A copy of such statement will be countersigned by the **Resident Engineer**, noting thereon any items not agreed to or questioned, and will be returned to the **Contractor** within two (2) **Days** after submission.

28.3 The **Contractor** and its **Subcontractors**, when required by the **Commissioner**, or the **Comptroller**, shall also produce for inspection, at the office of the **Contractor** or **Subcontractor**, any and all of its books, bid documents, financial statements, vouchers, records, daily job diaries and reports, and cancelled checks, and any other documents relating to showing the nature and quantity of the labor, materials, plant and equipment actually used in the performance of such **Work**, or in complying with such determination or order, and the amounts

expended therefor, and shall permit the **Commissioner** and the **Comptroller** to make such extracts therefrom, or copies thereof, as they or either of them may desire.

28.4 In connection with the examination provided for herein, the **Commissioner**, upon demand therefor, will produce for inspection by the **Contractor** such records as the **Agency** may have with respect to such **Extra** 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 for as long as such damages are incurred, 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 fully 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.

30.2 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, 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, 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, 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** or **Comptroller** 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** or **Comptroller** 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.

30.5 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 is not complied with as required, then the **Contractor** hereby consents to the dismissal of the action or dispute resolution procedure.

CHAPTER VII
POWERS OF THE RESIDENT ENGINEER,
THE ENGINEER OR ARCHITECT AND THE COMMISSIONER

ARTICLE 31. THE RESIDENT ENGINEER

31.1 The **Resident Engineer** shall have the power to inspect, supervise and control the performance of the **Work**, subject to review by the **Commissioner**. The **Resident Engineer** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 32. THE ENGINEER OR ARCHITECT OR PROJECT MANAGER

32.1 The **Engineer** or **Architect** or **Project Manager**, in addition to those matters elsewhere herein delegated to the **Engineer** and expressly made subject to his/her determination, direction or approval, shall have the power, subject to review by the **Commissioner**:

32.1.1 To determine the amount, quality, and location of the **Work** to be paid for hereunder; and

32.1.2 To determine all questions in relation to the **Work**, to interpret the **Contract Drawings**, **Specifications**, and **Addenda**, and to resolve all patent inconsistencies or ambiguities therein; and

32.1.3 To determine how the **Work** of this **Contract** shall be coordinated with **Work** of other **Contractors** engaged simultaneously on this **Project**, including the power to suspend any part of the **Work**, but not the whole thereof; and

32.1.4 To make minor changes in the **Work** as he/she deems necessary, provided such changes do not result in a net change in the cost to the **City** or to the **Contractor** of the **Work** to be done under the **Contract**; and

32.1.5 To amplify the **Contract Drawings**, add explanatory information and furnish additional **Specifications** and drawings, consistent with this **Contract**.

32.2 The foregoing enumeration shall not imply any limitation upon the power of the **Engineer** or **Architect** or **Project Manager**, for it is the intent of this **Contract** that all of the **Work** shall generally be subject to his/her determination, direction and approval, except where the determination, direction or approval of someone other than the **Engineer** or **Architect** or **Project Manager** is expressly called for herein.

32.3 The **Engineer** or **Architect** or **Project Manager** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 33. THE COMMISSIONER

33.1 The **Commissioner**, in addition to those matters elsewhere herein expressly made subject to his/her determination, direction or approval, shall have the power:

33.1.1 To review and make determinations on any and all questions in relation to this **Contract** and its performance; and

33.1.2 To modify or change this **Contract** so as to require the performance of **Extra Work** (subject, however, to the limitations specified in Article 25) or the omission of **Contract Work**; and

33.1.3 To suspend the whole or any part of the **Work** whenever in his/her judgment such suspension is required:

33.1.3(a) In the interest of the **City** generally; or

33.1.3(b) To coordinate the **Work** of the various **Contractors** engaged on this **Project** 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, officer, 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 Resident Engineer, or any other officer, 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 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 hours in duration.

ARTICLE 36. NO DISCRIMINATION

36.1 The **Contractor** specifically agrees, as required by Labor Law Section 220-e, as amended, that:

36.1.1 In the hiring of employees for the performance of **Work** under this **Contract** or any subcontract hereunder, neither the **Contractor**, **Subcontractor**, nor any person acting on behalf of such **Contractor** or **Subcontractor**, shall by reason of race, creed, color or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the **Work** to which the employment relates;

36.1.2 Neither the **Contractor**, **Subcontractor**, nor any person on its behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this **Contract** on account of race, creed, color or national origin;

36.1.3 There may be deducted from the amount payable to the **Contractor** by the **City** under this **Contract** a penalty of fifty (\$50.00) dollars for each person for each **Day** during which such person was discriminated against or intimidated in violation of the provisions of this **Contract**; and

36.1.4 This **Contract** may be cancelled or terminated by the **City** and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this article.

36.1.5 The aforesaid provisions of this article covering every **Contract** for or on behalf of the State or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the State of New York.

36.2 The **Contractor** specifically agrees, as required by Section 6-108 of the Administrative Code, as amended, that:

36.2.1 It shall be unlawful for any person engaged in the construction, alteration or repair of buildings or engaged in the construction or repair of streets or highways pursuant to a **Contract** with the **City** or engaged in the manufacture, sale or distribution of materials, equipment or supplies pursuant to a **Contract** with the **City** to refuse to employ or to refuse to continue in any employment any person on account of the race, color or creed of such person.

36.2.2 It shall be unlawful for any person or any servant, agent or employee of any person, described in Article 36.1.2, to ask, indicate or transmit, orally or in writing, directly or indirectly, the race, color or creed or religious affiliation of any person employed or seeking employment from such person, firm or corporation.

36.2.3 Breach of the foregoing provisions shall be deemed a violation of a material provision of this **Contract**.

36.2.4 Any person, or the employee, manager or owner of or officer of such firm or corporation who shall violate any of the provisions of this section shall, upon conviction thereof, be punished by

a fine of not more than one hundred (\$100.00) dollars or by imprisonment for not more than thirty (30) Days, or both.

36.3 This **Contract** is subject to the requirements of Executive Order No. 50 (1980) ("E.O. 50"), as revised, and the Rules and Regulations promulgated thereunder. No **Contract** will be awarded unless and until these requirements have been complied with in their entirety. By signing this **Contract**, the **Contractor** agrees that it:

36.3.1 Will not engage in any unlawful discrimination against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability, marital status or sexual orientation with respect to all employment decisions including, but not limited to, recruitment, hiring, upgrading, demotion, downgrading, transfer, training, rates of pay or other forms of compensation, layoff, termination, and all other terms and conditions of employment; and

36.3.2 Will not engage in any unlawful discrimination in the selection of **Subcontractors** on the basis of the owner's race, color, creed, national origin, sex, age, disability, marital status or sexual orientation; and

36.3.3 Will state in all solicitations or advertisements for employees placed by or on behalf of the **Contractor** that all qualified applicants will receive consideration for employment without unlawful discrimination based on race, creed, color, national origin, sex, age, citizens status, disability, marital status, sexual orientation, or that it is an equal employment opportunity employer; and

36.3.4 Will send to each labor organization or representative of workers with which it has a Collective Bargaining Agreement or other Contract or memorandum of understanding, written notification of its equal employment opportunity commitments under E.O. 50 and the Rules and Regulations promulgated thereunder; and

36.3.5 Will furnish all information and reports including an Employment Report before the award of the **Contract** which are required by E.O. 50, the Rules and Regulations promulgated thereunder, and orders of the 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.

Failure to comply with E.O. 50 and the rules and regulations promulgated thereunder, in one or more instances, may result in the **Agency** declaring the **Contractor** to be non-responsible.

The **Contractor** further agrees that it will refrain from entering into any **Contract** or **Contract** modification subject to E.O. 50 and the rules and regulations promulgated thereunder with a **Subcontractor** who is not in compliance with the requirements of E.O. 50 and the rules and regulations promulgated thereunder.

36.5 The **Contractor** specifically agrees, as required by Section 6-123 of the Administrative Code, that:

36.5.1 The **Contractor** will not engage in any unlawful discriminatory practice in violation of Title VIII of the Administrative Code;

36.5.2 every agreement between the **Contractor** and its **Subcontractors** in excess of \$50,000 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.); and

36.5.3 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 Section 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) calendar **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**. Minimum wages shall be the rates fixed by Federal **Law** and regulations.

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.

37.4 **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 wage scale as provided in Labor Law Section 220, as amended, or

37.4.1(b) Less than 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) and Minimum Wages (Article 37.2.6), the party responsible therefore 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 suits brought by the Corporation Counsel in the name of the **City**, in addition to damage for any other breach of this **Contract**, 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 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 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, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public work projects are rendered simultaneously, such **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public work 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 work 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 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 work project on which each worker, laborer or mechanic is entitled to receive the prevailing rate of wages and supplements for the occupation at which he or she is working. If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand dollars, such notice shall also include a statement that, that each worker, laborer or mechanic 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 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, which signed statement shall be maintained with the payroll records required by this **Contract**; and

37.6.3.1 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:** Provide laminated identification badges which indicate the worker's, laborer's or mechanic's name, trade, employer's name and employment starting date (month/day/year). Further, require as a condition of employment on the **Site**, that each and every worker, laborer or mechanic wear the laminated identification badge at all times and that it may be seen by any representative of the **City**; 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 in Article 37.6.1 in that language or languages as may be required. The **Contractor** is responsible for all distributions under 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 If this **Contract** is for an amount greater than \$1,000,000, 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 \$750,000, checks issued by a **Subcontractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**); and

37.6.8 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 37.6.1 through 37.6.7 may result in the **Commissioner** declaring the **Contractor** or **Subcontractor(s)** 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**.

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 with the provisions of this article 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** for 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** shall maintain on the **Site** the original payrolls or transcripts thereof which the **Contractor** and its **Subcontractor(s)** are required to maintain pursuant to **Labor Law** Section 220. The **Contractor** and **Subcontractor(s)** shall submit original payrolls or transcripts, subscribed and affirmed by it as true, with each and every payment requisition. 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 original payrolls or transcripts thereof, subscribed and affirmed by it as true, and the statements signed by each worker pursuant to this Chapter VIII. In addition, the **Contractor** and **Subcontractor(s)** shall furnish to the **Engineer** upon written demand any other information to satisfy the **Engineer** that this Chapter VIII and the **Labor Law**, as to the hours of employment and rates of wages, are being observed. The **Contractor** shall maintain the payrolls or transcripts thereof for six (6) years from the date of completion of the **Work** on this **Contract**.

38.2 When directed by the **Engineer**, the **Contractor** or **Subcontractor** shall provide the **Engineer** with an attendance sheet for each **Day** on which **Work** is performed on the **Site**. Such attendance sheet shall be in a form acceptable to the **Agency** and shall provide information for employees of the **Contractor** and **Subcontractor(s)**.

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** void.

CHAPTER IX PARTIAL AND FINAL PAYMENTS

ARTICLE 40. CONTRACT PRICE

40.1 The **City** shall pay, and the **Contractor** agrees to accept, in full consideration for the **Contractor's** performance of the **Work** subject to the terms and conditions hereof, the lump sum price or unit prices 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, unless otherwise directed by the **Resident Engineer**, the **Contractor** shall submit to the **Resident Engineer** a breakdown of its bid price, or of lump sums bid for items of the **Contract**, showing the various operations to be performed under the **Contract**, as directed in the progress schedule required under Article 9, and the value of each of such operations, the total of such items to equal the lump sum price bid. Said breakdown must be approved in writing by the **Resident Engineer**.

41.2 No partial payment will be approved until the **Contractor** submits a bid breakdown that is acceptable to the **Resident Engineer**.

41.3 The **Contractor** shall also submit such other information relating to the bid breakdown as directed by the **Resident Engineer**. Thereafter, the breakdown may be used only for checking the **Contractor's** applications for partial payments hereunder, but shall not be binding upon the **City**, the **Commissioner**, or the **Engineer** for any purpose whatsoever.

ARTICLE 42. PARTIAL PAYMENTS

42.1 From time to time as the **Work** progresses satisfactorily, but not more often than once a month, 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 such satisfactory payment application, 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 **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 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 section 43.5 herein, then the **Contractor** shall pay interest on amounts due to such **Subcontractor** or **Materialman** at a 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 NY General Business Law. Accrual of interest shall commence on the day immediately following the expiration of the seventh day following receipt of payment to the **Contractor** by 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 suppliers 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 When the **Work** in the opinion of the **Commissioner**, has been substantially but not entirely completed, he/she shall issue a certificate of **Substantial Completion**.

44.2 The **Contractor** shall submit with the **Substantial Completion** requisition:

44.2.1 A Final Verified Statement of any and all alleged claims against the **City** and any pending dispute resolution procedures in accord with the **PPB Rules** and this **Contract**, 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.

44.2.1(a) With respect to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the Corporation Counsel of the **City** 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 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, will have waived any such claims.

44.2.2 A Final Approved Punch List.

44.2.3 Where required, a request for a substantial or final extension of time.

44.3 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 where the **Contractor** shall fail 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.

44.4 No further partial payments shall be made to the **Contractor** after the **Commissioner** issues a Certificate of **Substantial Completion**, except the **Substantial Completion** payment and **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.

44.5 The **Contractor** acknowledges that nothing contained in this article 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. 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 and all alleged claims against the **City**, and any pending dispute resolution procedures in accord with the **PPB** Rules and this **Contract**, 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 Corporation Counsel of the **City** 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, is entitled 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 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 to 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 officers, agents or employees, excepting only a claim against the **City** for the amounts deducted or retained in accordance with the terms and provisions of this **Contract** or by **Law**, and excepting any claims, not otherwise waived, or any pending dispute resolution procedures which are contained in the verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45.

46.2 The **Contractor** is warned that the execution by it of a release, in connection with the acceptance of the final payment, containing language purporting to reserve claims other than those herein specifically excepted from the operation of this article, or those for amounts deducted by the **Commissioner** from the final requisition or by the **Comptroller** 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 officer, 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 from commencing an action for breach of **Contract** under this provision to the extent permitted by **Law** and by the terms of the **Contract** 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 mailing of such final payment. The statement shall specify the items upon which the claim will be based and any such claim shall be limited to such items.

ARTICLE 47. APPROVAL BY PUBLIC DESIGN COMMISSION

47.1 All works of art, including paintings, mural decorations, stained glass, statues, bas-reliefs and other sculptures, monuments, fountains, arches, and other structures of a permanent character intended for ornament or commemoration, and every design of the same to be used in the performance of this **Contract**, and the design of all bridges, approaches, buildings, gates, fences, lamps, or structures to be erected, pursuant to the terms of this **Contract**, shall be submitted to the Art Commission, d/b/a the Public Design Commission of the City of New York, and shall be approved by the Public Design Commission prior to the erection or placing in the position of the same. The final payment shall not become due or payable under this **Contract** unless and until the Public Design Commission shall certify that the design for the **Work** herein contracted for has been approved by the said Public Design Commission, and that the same has been executed in substantial accordance with the design so approved, pursuant to the provisions of Chapter 37, Section 854 of the City Charter, as amended.

CHAPTER X CONTRACTOR'S DEFAULT

ARTICLE 48. COMMISSIONER'S RIGHT TO DECLARE CONTRACTOR IN DEFAULT

48.1 In addition to those instances specifically referred to in other Articles herein, the **Commissioner** shall have the right to declare the **Contractor** in default of this **Contract** if:

48.1.1 The **Contractor** fails to commence **Work** when notified to do so by the **Commissioner**; or if

48.1.2 The **Contractor** shall abandon the **Work**; or if

48.1.3 The **Contractor** shall refuse to proceed with the **Work** when and as directed by the **Commissioner**; or if

48.1.4 The **Contractor** shall, without just cause, reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the **Commissioner**, to complete the **Work** in accordance with the Progress Schedule; or if

48.1.5 The **Contractor** shall fail or refuse to increase sufficiently such working force when ordered to do so by the **Commissioner**; or if

48.1.6 The **Contractor** shall sublet, assign, transfer, convert or otherwise dispose of this **Contract** other than as herein specified; or sell or assign a majority interest in the **Contractor**; or if

48.1.7 The **Contractor** fails to secure and maintain all required insurance; or if

48.1.8 A receiver or receivers are appointed to take charge of the **Contractor's** property or affairs; or if

48.1.9 The **Commissioner** shall be of the opinion that the **Contractor** is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the **Work**, or the award of necessary subcontracts, or the placing of necessary material and equipment orders; or if

48.1.10 The **Commissioner** shall be of the opinion that the **Contractor** is or has been willfully or in bad faith violating any of the provisions of this **Contract**; or if

48.1.11 The **Commissioner** shall be of the opinion that the **Work** cannot be completed within the time herein provided therefor or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the **Commissioner's** opinion, attributable to conditions within the **Contractor's** control; or if

48.1.12 The **Work** is not completed within the time herein provided therefor or within the time to which the **Contractor** may be entitled to have such completion extended; or if

48.1.13 Any statement or representation of the **Contractor** in the **Contract** or in any document submitted by the **Contractor** with respect to the **Work**, the **Project**, or the **Contract** (or for purposes of securing the **Contract**) was untrue or incorrect when made.

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 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 a lawsuit 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 provision 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 complete 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 previous provisions of this Chapter X shall be in addition to any and all other legal or equitable remedies permissible in the premises.

54.3 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**.

54.4 The expense of such completion, 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**.

**CHAPTER XI
MISCELLANEOUS PROVISIONS**

ARTICLE 55. CONTRACTOR'S WARRANTIES

55.1 In consideration of, and to induce, the award of this **Contract** to the **Contractor**, the **Contractor** represents and warrants:

55.1.1 That it is financially solvent, sufficiently experienced and competent to perform the **Work**; and

55.1.2 That the facts stated in its bid and the information given by it pursuant to the Information for Bidders is true and correct in all respects; and

55.1.3 That it has read and complied with all requirements set forth in the **Contract**.

ARTICLE 56. CLAIMS AND ACTIONS THEREON

56.1 Any claim, that is not subject to dispute resolution under the **PPB Rules** or this **Contract**, against the **City** for damages for breach of **Contract** shall not be made or asserted in any lawsuit, 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 lawsuit be instituted or maintained on any such claims unless such lawsuit is commenced within six (6) months after the date the **Commissioner** issues a Certificate of **Substantial Completion** pursuant to Article 44; except that:

56.2.1 Any claims arising out of events occurring after the date the **Commissioner** issues a Certificate of **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 Any claims for monies deducted, retained or withheld under the provisions of this **Contract** shall be asserted within six (6) months after the date when such monies becomes 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 lawsuit 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 indemnify the **City** against any and all claims and judgments for damages for any infringement of copyright and patents or use of patented articles, tools, materials, equipment, appliances or processes in the performance or completion of the **Work**, including all costs and expenses which the **City** shall or may incur or be obligated to pay by reason thereof.

ARTICLE 58. NO CLAIM AGAINST OFFICERS, AGENTS OR EMPLOYEES

58.1 No claim whatsoever shall be made by the **Contractor** against any officer, 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. SERVICES OF NOTICES

59.1 The **Contractor** hereby designates the business 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. Actual delivery of any such notice, direction or communication to the aforesaid place, or depositing it in a postpaid wrapper addressed thereto in any post office box (P.O. Box) regularly maintained by the United States Postal Service, shall be conclusively deemed to be sufficient service thereof upon the **Contractor** as the date of such delivery or deposit.

59.2 Such address 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, local taxes and Sales and Compensation Use Taxes of the State of New York and of cities and counties on all materials and supplies 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** or a **Subcontractor**, or to supplies and materials which even though they are consumed, are not incorporated into the completed **Work** (consumable supplies), and the **Contractor** and its **Subcontractors** shall be responsible for and pay any and all applicable taxes, including Sales and Compensation Use Taxes, on such leased tools, machinery, equipment or other property and upon all such unincorporated supplies and materials.

62.2 The **Contractor** agrees to sell and the **City** agrees to purchase all supplies and materials, other than consumable supplies, 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 supplies and materials shall be in full payment and consideration for the sale of such supplies and materials herein.

62.2.1 The **Contractor** agrees to construct the **Project** and to perform all **Work**, labor and services rendered, necessary, proper or incidental thereto for the sum shown in the bid for the performance of such **Work**, labor and services, and the sum so paid pursuant to this **Contract** for such **Work**, labor, etc., 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** and labor.

62.3 The purchase by the **Contractor** of the supplies and materials sold hereunder shall be a purchase or procurement for resale and therefore not subject to the New York State or **City** Sales or Compensation Use Taxes or any such taxes of cities or counties. The sale of such supplies and materials by the **Contractor** to the **City** is exempt from the aforesaid sales or compensating use taxes. With respect to such supplies and materials, 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 supplies and materials, free of liens and/or encumbrances, and the **Contractor** shall mark or otherwise identify all such materials as the property of the **City**.

62.4 Title to all materials 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 supplies and materials to the **Site** and prior to its becoming a part of the permanent structure and/or construction. Notwithstanding such transfer of title, the **Contractor** shall have the full and continuing responsibility to install such materials and supplies in accordance with the provisions of this **Contract**, protect them, maintain them in a proper condition and forthwith repair, replace and make good any damage thereto, theft or disappearance thereof, and furnish additional materials 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 such supplies and materials are rejected as being defective or otherwise unsatisfactory, title to all such supplies and materials shall be deemed to have been transferred back to the **Contractor**.

62.5 The purchase by **Subcontractors** of supplies and materials to be sold hereunder shall also be a purchase or procurement for resale to the **Contractor** (either directly or through other **Subcontractors**) and therefore not subject to the aforesaid Sales or Compensation Use Taxes, provided that the subcontract agreements provide for the resale of such supplies and materials prior to and separate and apart from the incorporation of such supplies and materials into the permanent structure and/or construction and that such subcontract agreements are in a form similar to this **Contract** with respect to the separation of the sale of materials from the **Work** and labor, services, consumable supplies and any other matters to be provided, and provided further that the subcontract agreements provide separate prices for materials and all other services and matters. Such separation shall actually be followed in practice, including the separation of payments for supplies and materials from the payments for other **Work** and labor and other things to be provided.

62.6 The **Contractor** and its **Subcontractors** and Materialmen shall obtain any and all necessary **Contractor** Exempt Purchase Certificates or Resale Certificates from the appropriate governmental **Agency** or

Agencies, and furnish a **Contractor Exempt Purchase Certificate** or **Resale Certificate** to all persons, firms or corporations from which they purchase supplies and materials for the performance of the **Work** covered by this **Contract**.

62.7 In the event any of the provisions of this article shall be deemed to be in conflict with any other provisions of this **Contract** or create any ambiguity, then the provisions of this article shall control.

ARTICLE 63. INVESTIGATION(S) CLAUSE

63.1 The parties to this **Contract** agree to cooperate fully and faithfully with any investigation, audit or inquiry conducted by a United States, a State of New York (State) or a **City** governmental **Agency** or authority that is empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath, or conducted by the Inspector General of a governmental **Agency** that is a party in interest to the transaction, submitted bid, submitted proposal, **Contract**, lease, permit or license that is the subject of the investigation, audit or inquiry.

63.2 If any person who has been advised that his/her statement, and any information from such statement, will not be used against him/her in any subsequent criminal proceeding refuses to testify before a grand jury or other governmental **Agency** or authority empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath concerning the award of or performance under any transaction, agreement, lease, permit, **Contract**, or license entered into with the **City**, the State, or any political subdivision or public authority thereof, or the Port Authority of New York and New Jersey, or any local development corporation within the **City**, or any public benefit corporation organized under the **Laws** of the State of New York, or;

63.3 If any person refuses to testify for a reason other than the assertion of his/her privilege against self incrimination in an investigation, audit or inquiry conducted by a **City** or State governmental **Agency** or authority empowered directly or by designation to compel the attendance of witnesses and to take testimony under oath, or by the Inspector General of the governmental **Agency** that is a party in interest in, and is seeking testimony concerning the award of, or performance under any transaction, agreement, lease, permit, **Contract**, or license entered into with the **City**, the State, or any political subdivision thereof or any local development corporation within the **City**, then;

63.4 The **Commissioner** whose **Agency** is a party in interest to the transaction, submitted bid, submitted proposal, **Contract**, lease, permit, or license shall convene a hearing, upon not less than five (5) days written notice to the parties involved to determine if any penalties should attach for the failure of a person to testify.

63.5 If any non-governmental party to the hearing requests an adjournment, the **Commissioner** who convened the hearing may, upon granting the adjournment, suspend any **Contract**, lease, permit, or license, pending the final determination pursuant to Article 63.7 without the **City** incurring any penalty or damages for delay or otherwise.

63.6 The penalties which may attach after a final determination by the **Commissioner** may include but shall not exceed:

63.6.1 The disqualification for a period not to exceed five (5) years from the date of an adverse determination for any person, or any entity of which such person was a member at the time the testimony was sought, from submitting bids for, or transacting business with, or entering into or obtaining any **Contract**, lease, permit or license with or from the **City**; and/or

63.6.2 The cancellation or termination of any and all such existing **City Contracts**, leases, permits or licenses that the refusal to testify concerns and that have not been assigned as permitted under this **Agreement**, nor the proceeds of which pledged, to an unaffiliated and unrelated institutional lender for fair value prior to the issuance of the notice scheduling the hearing, without the **City** incurring any penalty or damages on account of such cancellation or termination; monies lawfully due for goods delivered, **Work** done, rentals, or fees accrued prior to the cancellation or termination shall be paid by the **City**.

63.7 The **Commissioner** shall consider and address in reaching his/her determination and in assessing an appropriate penalty the factors in Articles 63.7.1 and 63.7.2. The **Commissioner** may also consider, if relevant and appropriate, the criteria established in Articles 63.7.3 and 63.7.4, in addition to any other information which may be relevant and appropriate:

63.7.1 The party's good faith endeavors or lack thereof to cooperate fully and faithfully with any governmental investigation or audit, including but not limited to the discipline, discharge, or disassociation of any person failing to testify, the production of accurate and complete books and records, and the forthcoming testimony of all other members, agents, assignees or fiduciaries whose testimony is sought.

63.7.2 The relationship of the person who refused to testify to any entity that is a party to the hearing, including but not limited to, whether the person whose testimony is sought has an ownership interest in the entity and/or the degree of authority and responsibility the person has within the entity.

63.7.3 The nexus of the testimony sought to the subject entity and its **Contracts**, leases, permits or licenses with the **City**.

63.7.4 The effect a penalty may have on an unaffiliated and unrelated party or entity that has a significant interest in an entity subject to penalties under Article 63.6, provided that the party or entity has given actual notice to the **Commissioner** upon the acquisition of the interest, or at the hearing called for in Article 63.4, gives notice and proves that such interest was previously acquired. Under either circumstance the party or entity shall present evidence at the hearing demonstrating the potential adverse impact a penalty will have on such person or entity.

63.8 Definitions:

63.8.1 The term "license" or "permit" as used herein 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 herein 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 herein 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 herein 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 **Contract**.

64.2 In the event of termination by the **City** pursuant to this article, 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 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 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, less salvage value, 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:

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, whichever is less, 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 Article 64.2.1(b)(i) or Article 64.2.1(b)(ii), whichever applies.

64.2.1(c) Except as otherwise provided in Article 64.2.1(d), on all lump sum **Contracts**, the **Contractor** shall be paid the percentage indicated below applied to the difference between the total lump sum bid amount and the total of all payments made prior to the notice of termination plus all payments allowed pursuant to Articles 64.2.1(a) and 64.2.1(b):

64.2.1(c)(i) Five (5%) percent of the first five million (\$5,000,000.) dollars; and

64.2.1(c)(ii) Three (3%) percent of any amount between five million (\$5,000,000.) dollars and fifteen million (\$15,000,000.) dollars; plus

64.2.1(c)(iii) One (1%) percent of any amount over fifteen million (\$15,000,000.) dollars.

64.2.1(d) In the event the City terminates a lump sum **Contract** pursuant to this article 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.

64.2.2 Unit Price Contracts or Items: On all unit price **Contracts**, or on unit price items in a **Contract**, the City will pay the **Contractor** the sum of Articles 64.2.2(a) and 64.2.2(b), less all payments previously made pursuant to this **Contract**:

64.2.2(a) For all completed units, the unit price stated in the **Contract**, and

64.2.2(b) For units that have been ordered but are only partially completed, the **Contractor** will be paid:

64.2.2(b)(i) A pro rata portion of the unit price stated in the **Contract** based upon the percent completion of the unit and

64.2.2(b)(ii) For non-cancelable material and equipment, payment will be made pursuant to Article 64.2.1(b).

64.2.3 Time and Material Contracts or Items: On all **Contracts** or items in a **Contract** where time and material records are specified as the basis for payment of the **Work**, 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 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 Cost shall not include overhead.

64.3 In no event shall any payments under this article exceed the **Contract** price for such items.

64.4 All payments pursuant to this article 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, 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 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** of New York, State of New York, 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 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 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 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 United States 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 State of New York, upon request of the **City**, the **Contractor** shall either consent to a transfer of the action to a State Court of competent jurisdiction located in the **City** and State 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 State Court of competent jurisdiction in the **City**.

65.3 If any provision(s) of this article is held unenforceable for any reason, each and all other provision(s) shall nevertheless remain in full force and effect.

ARTICLE 66. PARTICIPATION IN AN INTERNATIONAL BOYCOTT

66.1 The **Contractor** agrees that neither the **Contractor** nor any substantially owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the Export Administration Act of 1979, as amended, or the regulations of the United States Department of Commerce 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, 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.

67.2 Unless specifically waived by the **Commissioner** with the approval of the Division of Economic and Financial Opportunity of the 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 enterprise ("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 prime **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 LBE's 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 **Contract**. Remedy for such breach of **Contract** may include the imposition of any or all of the following sanctions:

67.6.1 Reducing a **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 Where non-compliance is by an LBE, de-certifying and declaring the LBE 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** and rules, that it is in the best interest of the **City** that the **Contract** be awarded to other than the lowest responsible pursuant to Section 313(b)(2) of the **City Charter**.

69.1.4 In the case of **Contracts** let by other than competitive sealed bidding, if a prospective **Contractor** does not agree to these conditions, no **Agency**, elected official or the **City Council** shall award the **Contract** to that bidder unless the **Agency** seeking to use the goods, services or construction certifies in writing that the **Contract** is necessary for the **Agency** to perform its functions and there is no other responsible **Contractor** who will supply goods, services or construction of comparable quality at a comparable price.

69.2 In accordance with Section 6-115.1 of the Administrative Code, the **Contractor** stipulates that such **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** either:

69.2.1 Have no business operations in Northern Ireland, or

69.2.2 Shall take lawful steps in good faith to conduct any business operations they have in Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles.

69.3 For purposes of this Article, the following terms shall have the following meanings:

69.3.1 "MacBride Principles" shall mean those principles relating to nondiscrimination in employment and freedom of work-place opportunity which require employers doing business in Northern Ireland to:

69.3.1(a) increase the representation of individuals from under-represented religious groups in the workforce, including managerial, supervisory, administrative, clerical and technical jobs;

69.3.1(b) take steps to promote adequate security for the protection of employees from under-represented religious groups both at the work-place and while traveling to and from Work;

69.3.1(c) ban provocative religious or political emblems from the workplace;

69.3.1(d) publicly advertise all job openings and make special recruitment efforts to attract applicants from under-represented religious groups;

69.3.1(e) establish layoff, recall and termination procedures which do not in practice favor a particular religious group;

69.3.1(f) abolish all job reservations, apprenticeship restrictions and different employment criteria which discriminate on the basis of religion;

69.3.1(g) develop training programs that will prepare substantial numbers of current employees from under-represented religious groups for skilled jobs, including the expansion of existing programs and the creation of new programs to train, upgrade and improve the skills of workers from under-represented religious groups;

69.3.1(h) establish procedures to assess, identify and actively recruit employees from under-represented religious groups with potential for further advancement; and

69.3.1(i) appoint a senior management staff member to oversee affirmative action efforts and develop a timetable to ensure their full implementation.

69.4 The **Contractor** agrees that the covenants and representations in Article 69.2 are material conditions to this **Contract**. In the event the **Agency** receives information that the **Contractor** who made the stipulation required by this Article 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. HEALTH INSURANCE COVERAGE

70.1 If the price for which this **Contract** was awarded exceeds \$100,000, or if the price for which this **Contract** was awarded when combined with other construction or services contracts awarded the **Contractor** by the **City** in the year prior to award of this **Contract** exceeds \$100,000, the **Contractor**, following registration of the **Contract**, shall be required to submit responses to requests for information regarding the nature of any health insurance provided by the **Contractor** to its employees and their spouses and domestic partners, upon request of the **Agency** or other designated **City** agency.

ARTICLE 71. PROHIBITION OF TROPICAL HARDWOODS

71.1 Tropical hardwoods, as defined in Section 165 of the New York State Finance Law ("Finance Law"), shall not be utilized in the performance of this **Contract** except as expressly permitted by Section 165 of the Finance Law.

ARTICLE 72. CONFLICTS OF INTEREST

72.1 Section 2604 of the **City Charter** and other related provisions of the **City Charter**, the **Administrative Code** and the **Penal Law** are applicable under the terms of this **Contract** in relation to **Conflicts of Interest** and shall be extended to **Subcontractors** authorized to perform **Work**, labor and services pursuant to this **Contract** and further, it shall be the duty and responsibility of the **Contractor** to so inform its respective **Subcontractors**. Notice is hereby given that, under certain circumstances, penalties may be invoked against the donor as well as the recipient of any form of valuable gift.

ARTICLE 73. MERGER CLAUSE

73.1 The **Written Contract** herein, contains all the terms and conditions agreed upon by the parties hereto, and no other agreement, oral or otherwise, regarding the subject matter of this **Contract** shall be deemed to exist or to bind any of the parties hereto, or to vary any of the terms contained herein.

ARTICLE 74. STATEMENT OF WORK

74.1 The **Contractor** shall furnish all labor and materials and perform all **Work** in strict accordance with the **Specifications** and **Addenda** thereto, numbered 3.

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 of: *EIGHTEEN MILLION* Dollars, (\$*18,407,814.00*), 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.

Four Hundred Seven Thousand Eight Hundred Fourteen and 00/100 - ←

ARTICLE 76. ELECTRONIC FUNDS TRANSFER

76.1 In accordance with Section 6-107.1 of the New York City Administrative Code, the Contractor agrees to accept payments under this Agreement from the City by electronic funds transfer. An electronic funds transfer 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 Agreement, 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 Finance with information necessary for Contractor to receive electronic funds transfer payments through the 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 agreement. 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 agency head may waive the application of the requirements herein to payments on contracts entered into pursuant to §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 contracting agency may waive the requirements hereunder 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 – PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS
ENTERPRISES IN CITY PROCUREMENT**

NOTICE TO ALL PROSPECTIVE CONTRACTORS

ARTICLE I. M/WBE PROGRAM

Local Law No. 129 of 2005 added Section 6-129 to the Administrative Code of the City of New York. The local law creates a program for participation by minority-owned and women-owned business enterprises (MBEs and WBEs) in City procurement. As stated in the 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 made pursuant to Local Law 129, and the rules of the Department of Small Business Services ("DSBS") promulgated thereunder.

If this Contract is subject to the Minority-Owned and Women-Owned Business Enterprise ("M/WBE") program created by Local Law 129, the specific requirements of M/WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the "Subcontractor Utilization Plan"), and are detailed below. The Contractor must comply with all applicable M/WBE requirements for this Contract. Schedule B of the Contract ("Subcontractor Utilization Plan") is included in the Bid Booklet.

Article I, Part A, below, sets forth provisions related to the participation goals for construction 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
AND PROFESSIONAL SERVICES CONTRACTS**

1. The Target Subcontracting Percentage applicable to this Contract is set forth on Schedule B, Part I to this Contract (see Page 1, line (1)). The "Target Subcontracting Percentage" is the percentage of the total Contract which Agency anticipates that the prime contractor for this Contract would in the normal course of business award to one or more subcontractors for amounts under \$1 million for construction and professional services.

A prospective contractor may seek a full or partial pre-award waiver of the Target Subcontracting Percentage in accordance with Local Law 129 and Part A, Section 10 below. To apply for the a full or partial waiver of the Target Subcontracting Percentage, a prospective contractor must complete Part III (Page 4) of Schedule B, and must submit such request no later than seven (7) days prior to the date and time the bids or proposals are due, in writing to the Agency by e-mail at poped@ddc.nyc.gov or via facsimile at (718) 391-1885. Bidders/proposers who have submitted requests will receive a response by no later than two (2) calendar days prior to the date bids or proposals are due, provided, however, that if that date would fall on a weekend or holiday, a response will be provided by close-of-business on the business day before such weekend or holiday date.

2. The Subcontractor Participation Goals established for this Contract are set forth on Schedule B, Part I to this Contract (see Page 1, line (2) and/or line (3)). The Subcontractor Participation Goals represent a percentage of the total dollar value of all construction and/or professional services subcontracts under this Agreement for amounts under \$1 million.

3. If Subcontractor Participation Goals have been established for this Contract, Contractor agrees or shall agree as a material term of the Agreement that, with respect to the total amount of the Agreement to be awarded to one or more subcontractors pursuant to subcontracts for amounts under \$1 million, Contractor shall be subject to the Subcontractor Participation Goals, unless the goals are modified by Agency in accordance with Local Law 129 and Part A, Section 11 below.

4. If Subcontractor 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, Part II Subcontractor Utilization Plan (see Page 2-3) indicating: (a) the percentage of work it intends to subcontract; (b) the percentage of work it intends to

award to subcontractors for amounts under \$1 million; (c) in cases where the prospective contractor intends to award subcontracts for amounts under \$1 million, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs; and (d) the general time frames in which such work by MBEs and/or WBEs is scheduled to occur. In the event that this Subcontractor Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to award the **Target Subcontracting Percentage**, 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 **Target Subcontracting Percentage** in accordance with Local Law 129 and Part A, Section 10 below.

THE BIDDER/PROPOSER MUST COMPLETE THE SUBCONTRACTOR UTILIZATION PLAN INCLUDED HEREIN (SCHEDULE B, PART II). SUBCONTRACTOR UTILIZATION PLANS WHICH DO NOT INCLUDE THE REQUIRED AFFIRMATIONS WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE TARGET SUBCONTRACTING PERCENTAGE IS GRANTED (SCHEDULE B PART III). IN THE EVENT THAT THE CITY DETERMINES THAT VENDOR HAS SUBMITTED A SUBCONTRACTOR UTILIZATION PLAN WHERE THE REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE PLAN ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE AFFIRMATION, THE VENDOR 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 PLAN 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 EMAILED OR FAXED (IF THE VENDOR HAS PROVIDED AN EMAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.

5. Where a Subcontractor 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. **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 Subcontractor Participation Goals established for this Contract by proposing one or more subcontractors that are M/WBEs for any portion of the Wicks trade work if the amount to be awarded to such M/WBE subcontractor is under \$1 million. 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. M/WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the M/WBE participation goals. Such certification must occur prior to the firms' commencement of work as subcontractors. A list of M/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) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th 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.

7. Where a Subcontractor 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 paid to subcontractors (including subcontractors that are not MBEs or WBEs); the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor pursuant to such plan as well as 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 paid to subcontractors (including subcontractors that are not MBEs or WBEs); 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 hired pursuant to such plan, 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 Subcontractor Utilization Plan, Agency shall take appropriate action, in accordance with Local Law 129 and Article II below, unless the Contractor has obtained a modification of its Subcontractor Utilization Plan in accordance with Local Law 129 and Part A, Section 11 below.

9. Where a Subcontractor Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds 10 percent of the Agreement, Agency shall establish participation goals for the work to be performed pursuant to the change order.

10. **Pre-award waiver of Target Subcontracting Percentage.** Agency may grant a full or partial waiver of the **Target Subcontracting Percentage** to a bidder or proposer, as applicable, who demonstrates—before submission of the bid or proposal—that it has legitimate business reasons for proposing the level of subcontracting in its Subcontractor Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder or proposer, 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 for under one million dollars represented by the **Target Subcontracting Percentage**. In making such determination, Agency may consider whether the Subcontractor Utilization Plan is consistent with past subcontracting practices of the bidder or proposer, as applicable, and whether the bidder or proposer, as applicable, has made good faith efforts to identify portions of the Contract that it intends to subcontract.

11. **Modification of Subcontractor Utilization Plan.** A Contractor may request a modification of its Subcontractor Utilization Plan (**Subcontractor Participation Goals**) 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 Subcontractor Utilization Plan as part of its bid submission.** The Agency may grant a request for Modification of a Contractor's Subcontractor 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 **Subcontractor Participation Goals**. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

- (a) 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;
- (b) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;
- (c) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs and WBEs that their interest in the Contract was solicited;
- (d) 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 Subcontractor Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;
- (e) 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;
- (f) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts;
- (g) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;
- (h) 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.

12. If this Contract is for an indefinite quantity of construction or professional services or is a requirements type contract and the Contractor has submitted a Subcontractor Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Subcontractor Participation Goals**, the Contractor will not be deemed in violation of the M/WBE 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.

13. If **Subcontractor Participation Goals** have been established for 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 Subcontractor 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 Subcontractor Utilization Plan.
2. Pursuant to DSBS rules, construction contracts that include a requirement for a Subcontractor Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Administrative Code Section 6-108.1.
3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and WBEs in contracts.
4. Prospective contractors are encouraged to enter into joint ventures with MBEs and WBEs.
5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE requirements set forth herein and the pertinent provisions of Local Law 129 of 2005, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE requirements of this Contract and pertinent provisions of Local Law 129 of 2005, 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 M/WBE's to meet the required **Subcontractor 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 Subcontractor Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering 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 this Section 6-129, including, but not limited any Subcontractor 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) assess liquidated damages or reduction of fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the program established by Section 6-129, 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) exercise 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) take any other appropriate remedy.

4. If a Subcontractor Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to award subcontracts to MBEs and/or WBEs sufficient to meet the Subcontractor Participation Goals contained in its Subcontractor Utilization Plan or the Subcontractor 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 subcontracts required to be awarded to MBE and/or WBE subcontractors to meet the Subcontractor Participation Goals and the dollar amount the Contractor actually awarded and paid to MBE and/or WBE subcontractors. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the Subcontractor 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 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), 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.

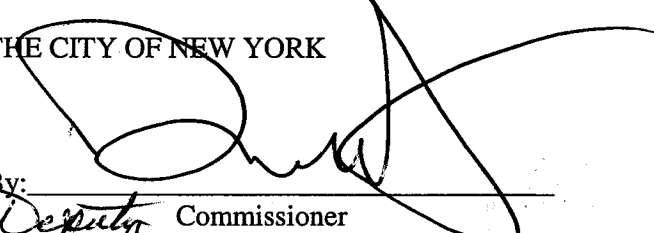
6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE 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 Subcontractor Utilization Plan shall be a factor in the evaluation of its performance. Whenever a contracting agency determines that a contractor's compliance with a Subcontractor Utilization Plan has been unsatisfactory, the agency shall, after consultation with the city chief procurement officer, file an advice of caution form for inclusion in VENDEX as caution data.

Deputy

IN WITNESS WHEREOF, the Commissioner, on behalf of the City of New York, and the Contractor, have executed this agreement in quadruplicate, two parts of which are to remain with the Commissioner, another to be filed with the Comptroller of the City, and the fourth to be delivered to the Contractor.

THE CITY OF NEW YORK

By: 

Deputy Commissioner

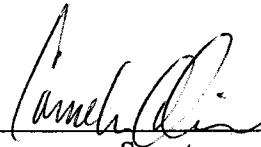
CONTRACTOR:

By: 

(Member of Firm or Officer of Corporation)

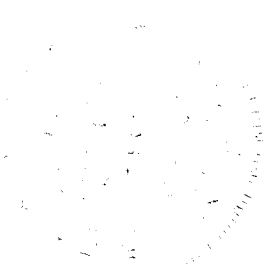
Title: President

(Where Contractor is a Corporation, add):
Attest:



Secretary

(Seal)



ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Queens ss:

On this 27th day of February 2014, before me personally came Carmelina Oliveira to me known, who, being by me duly sworn did depose and say that he resides at 91 Longfellow Ave. Lantana, NY 11756 that he is the President of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

LUCY AMADOR
Notary Public - State of NY
No. 01RA6130289
Qualified in Nassau County
My Commission Expires 7/18/17

Lucy Amador
Notary Public or Commissioner of Deeds

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:

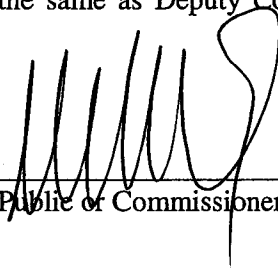
On this _____ day of _____, before me personally appeared _____ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT BY COMMISSIONER

State of New York County of Queens ss:

On this 28th day of Feb. 2014, before me personally came David Resniak to me known, and known to be the Deputy Commissioner of the Department of Design and Construction of The City of New York, the person described as such in and who as such executed the foregoing instrument and he acknowledged to me that he executed the same as Deputy Commissioner for the purposes therein mentioned.



Notary Public or Commissioner of Deeds

VICTORIA AYO-VAUGHAN
Notary Public, State of New York
Registration #01AY5014042
Qualified In Queens County 15
Commission Expires July 15, 2015

AUTHORITY

MAYOR'S CERTIFICATE NO. CBX
BUDGET DIRECTOR'S CERTIFICATE NO.

DATED
DATED

APPROPRIATION
COMMISSIONER'S CERTIFICATE

In conformity with the provisions of Section 6-101 of the Administrative Code of the City of New York, it is hereby certified that the estimated cost of the work, materials and supplies required by the within Contract, amounting to

*Eighteen Million Four Hundred Seven Thousand
Eight Hundred Fourteen and 00/100*

Dollars (\$ 18,407,814.00)

is chargeable to the fund of the Department of Design and Construction entitled Code

Department of Design and Construction

I hereby certify that the specifications contained herein comply with the terms and conditions of the BUDGET.

[Signature]

Deputy Commissioner

COMPTROLLER'S CERTIFICATE

The City of New York _____

Pursuant to the provisions of Section 6-101 of the Administrative Code of the City of New York, I hereby certify that there remains unapplied and unexpended a balance of the above mentioned fund applicable to this Contract sufficient to pay the estimated expense of executing the same viz:

\$ _____

Comptroller

**MAYOR'S CERTIFICATE OR
CERTIFICATE OF THE DIRECTOR
OF THE BUDGET**

Performance Bond #1 (Pages 80 to 83): 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)

PERFORMANCE BOND #1

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

hereinafter referred to as the "Principal", and _____

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

(\$ _____) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

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



CERTIFICATE OF LIABILITY INSURANCE

OLIVE-1

OP ID: JQ

DATE (MM/DD/YYYY)
02/27/14

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 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 Robert P. Brady Agency, Inc. 487 New York Avenue Huntington, NY 11743 Clifford T. Brady	631-673-0500	CONTACT NAME: Clifford T. Brady	FAX (A/C, No): 631-673-0440
	631-423-0956	PHONE (A/C, No, Ext): 631-673-0500	
INSURED Oliveira Contracting Inc. 15 Albertson Avenue Albertson, NY 11507		INSURER(S) AFFORDING COVERAGE	
		INSURER A: American Empire Surplus Lines	NAIC # 35351
		INSURER B: State Insurance Fund	36102
		INSURER C: RSUI Indemnity Co.	22314
		INSURER D: Allmerica Financial Benefit	41840
		INSURER E: Allied World National	10690
		INSURER F: National Benefit Life	61409

COVERAGES

CERTIFICATE NUMBER:

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 SUBR INSR	WOOD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER <input type="checkbox"/> POLICY <input type="checkbox"/> PROJ <input type="checkbox"/> LOC			13CG0177351	07/27/13	07/27/14	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 50,000 MED EXP (Any one person) \$ N/A PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 5,000,000 PRODUCTS - COM/OP AGG \$ 2,000,000
D	<input type="checkbox"/> AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS			AWY-5625752-04	06/03/13	06/03/14	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
C	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$ 10,000			NHA060756	07/27/13	07/27/14	EACH OCCURRENCE \$ 3,000,000 AGGREGATE \$ 3,000,000
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below Y/N <input checked="" type="checkbox"/> N		N/A	22992226	09/16/13	04/01/14	<input checked="" type="checkbox"/> WC STATU-TOBY LIMITS OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000
E	Pollution Liabilit			5152-001209	07/12/13	07/12/14	Aggregate 2,000,000
F	Disability			8910-0400996	01/01/14	12/31/14	Statutory Limits

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)
 City of New York, including its officials and employees is named as addition insured.

CERTIFICATE HOLDER

CANCELLATION

CITY OF N

CITY OF NEW YORK
 C/O DEPT. OF TRANSPORTATION
 220 Church St. - Ground Floor
 New York, NY 10013

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
 Clifford T. Brady

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SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Broker's Certification

[Pursuant to Article 22.3.1(a) of the **Contract**, every Certificate of Insurance must be accompanied by either the following certification by the broker setting forth the following text and required information and signatures or complete copies of all policies referenced in the Certificate of Insurance. In the absence of completed policies, binders are acceptable.]

CERTIFICATION BY BROKER

The undersigned insurance broker represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects, and that the described insurance is effective as of the date of this Certification.

ROBERT P. BRADY AGENCY, INC.

[Name of broker (typewritten)]

487 NEW YORK AVENUE, HUNTINGTON NY 11743

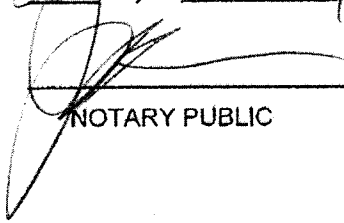
[Address of broker (typewritten)]

[Signature of authorized official or broker]

CLIFFORD T. BRADY, VICE PRESIDENT

[Name and title of authorized official (typewritten)]

Sworn to before me this
28 day of February 2014



NOTARY PUBLIC

JENNIFER A. BRADY
NOTARY PUBLIC STATE OF NEW YORK
NO 01BR4949501
QUALIFIED IN SUFFOLK COUNTY
COMMISSION EXPIRES APRIL 17, 2015



Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2 Bond #58657507

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

Oliveira Contracting, Inc. _____

15 Albertson Ave. _____

Albertson, NY 11507 _____

hereinafter referred to as the "Principal", and _____

Western Surety Company _____

PO Box 5077 _____

Sioux Falls, SD 57117-5011 _____

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

Eighteen Million Four Hundred Seven Thousand Eight Hundred Fourteen and 00/100

(\$ 18,407,814.00) 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
FMS ID: S195-227S - E-PIN: 85013B0016001 - DDC PIN: 8502014TR0001C - Spring Street

Salt Shed Construction - Borough of Manhattan

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



NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to either (1) pay the full amount of the above penal sum in complete discharge and exoneration of this bond and of all the liabilities of the Surety relating to this bond, or (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof. The Surety (Sureties) further agrees, at its option, either to tender the penal sum or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. The Surety and the City reserve all rights and defenses each may have against the other, provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to commence and to complete all Work as provided herein.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any Work to be performed or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.



Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers; this 27th day of February, 2014.

(Seal)

Oliveira Contracting, Inc. _____ (L.S.)
Principal

By: [Signature]
Carmelina Oliveira, President

(Seal)

Western Surety Company _____
Surety

By: [Signature]
Robert Kempner, Attorney-In-Fact

(Seal)

Surety

By: _____

(Seal)

Surety

By: _____

(Seal)

Surety

By: _____

(Seal)

Surety

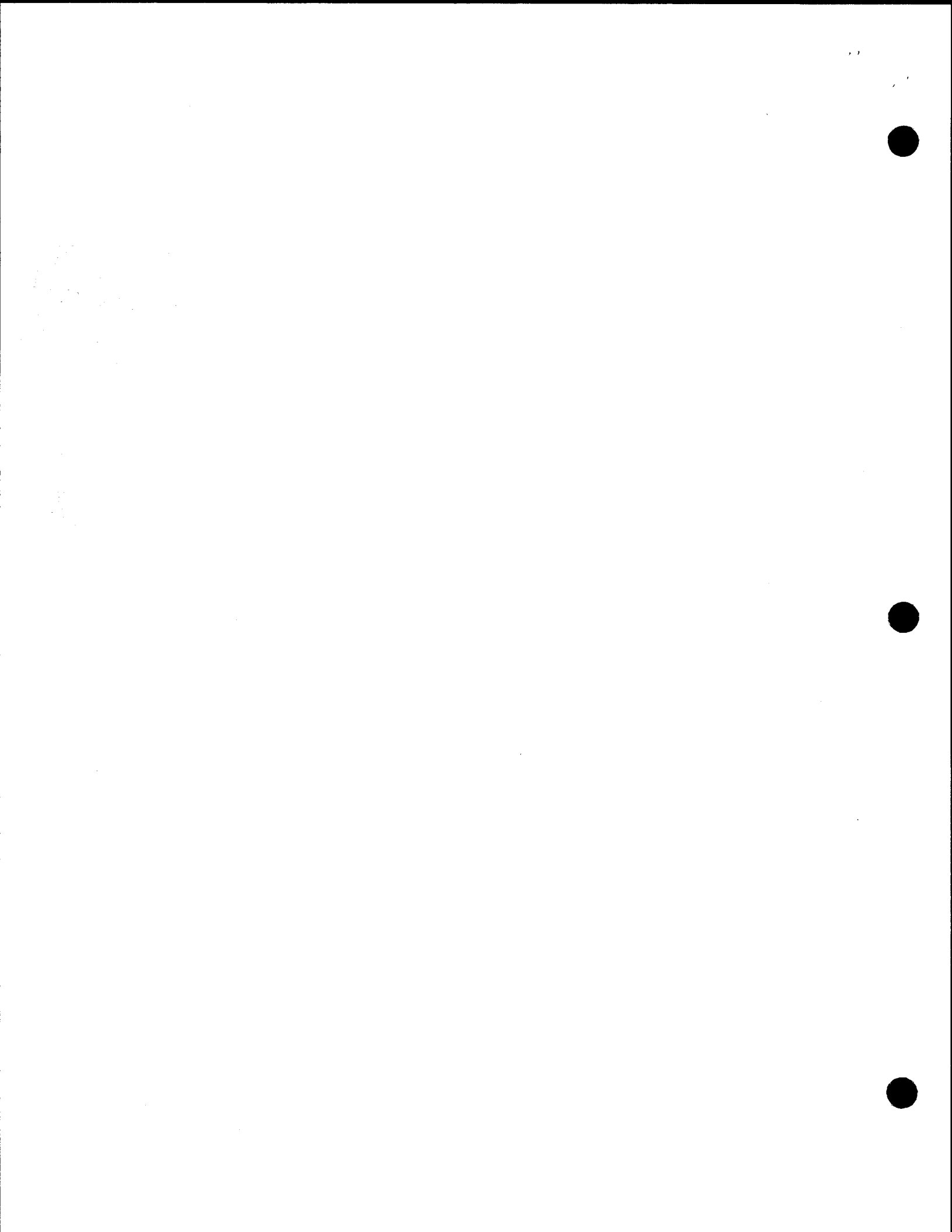
Bond Premium Rate _____

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 a duly authorized officer, agent, or attorney-in-fact.

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



ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Nassau ss:

On this 27th day of February, 2014 before me personally came Carmelina Oliveira to me known, who, being by me duly sworn did depose and say that he/she resides at Levittown, NY; that he/she is the President of Oliveira Contracting, Inc. corporation described in and which executed the foregoing instrument; and that he signed his name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

LYNN ANN INFANTI
Notary Public, State of New York
No. 01IN6004351
Qualified in Suffolk County 2018
Commission Expires March 23, 2018

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, 20____ before me personally came _____ to me known, who, being by me duly sworn did depose and say that he/she resides at _____; that he/she is _____ partner of _____, a limited/general partnership existing under the laws of the State of _____ the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, 20____ before me personally came _____ to me known, who, being by me duly sworn did depose and say that he/she resides at _____, and that he/she is the individual whose name is subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument, said individual executed the instrument.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

Affix Acknowledgments and Justification of Sureties.



ACKNOWLEDGEMENT OF PRINCIPAL, OF A CORPORATION

STATE OF _____

COUNTY OF _____

ss:

On this _____ day of _____, _____ before me personally came _____ to me known, who, being by me duly sworn did depose and say that he resides at _____ that he is the _____ 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 the foregoing instrument is such seal; that it was an affixed by order of the board of directors of said corporation; and that he signed his name thereto by like order.

Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF New York

COUNTY OF Nassau

ss:

On this 27th day of February, 2014, before me personally came Robert Kempner to me known, who, being by me duly sworn, did depose and say that he is an Attorney-In-Fact of Western Surety Company the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed and said instrument and affixed the said seal as Attorney-In-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

LYNN ANN INFANTI
Notary Public, State of New York
No. 011N6004351
Qualified in Suffolk County
Commission Expires March 23, 2018



My commission expires _____

Notary Public



Western Surety Company

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That WESTERN SURETY COMPANY, a South Dakota corporation, is a duly organized and existing corporation having its principal office in the City of Sioux Falls, and State of South Dakota, and that it does by virtue of the signature and seal herein affixed hereby make, constitute and appoint

Susan P Hammel, Joseph Sfozo, Robert Kempner, Robert W O Kane, Individually

of Plainview, NY, its true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on its behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind it thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of the corporation and all the acts of said Attorney, pursuant to the authority hereby given, are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law printed on the reverse hereof, duly adopted, as indicated, by the shareholders of the corporation.

In Witness Whereof, WESTERN SURETY COMPANY has caused these presents to be signed by its Vice President and its corporate seal to be hereto affixed on this 10th day of October, 2013.



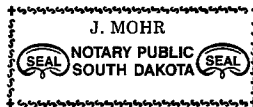
WESTERN SURETY COMPANY

Paul T. Brufat
Paul T. Brufat, Vice President

State of South Dakota }
County of Minnehaha } ss

On this 10th day of October, 2013, before me personally came Paul T. Brufat, to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is the Vice President of WESTERN SURETY COMPANY described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporation.

My commission expires
June 23, 2015



J. Mohr
J. Mohr, Notary Public

CERTIFICATE

I, L. Nelson, Assistant Secretary of WESTERN SURETY COMPANY do hereby certify that the Power of Attorney hereinabove set forth is still in force, and further certify that the By-Law of the corporation printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporation this 27th day of February, 2014



WESTERN SURETY COMPANY

L. Nelson
L. Nelson, Assistant Secretary



WESTERN SURETY COMPANY
Sioux Falls, South Dakota
Statement of Net Admitted Assets and Liabilities
December 31, 2012

ASSETS

Bonds	\$1,544,217,378
Stocks	23,405,721
Cash and short-term investments	85,332,658
Uncollected premiums and agents' balances	32,034,747
Amounts recoverable from reinsurers	163,180
Net deferred tax asset	23,141,708
Electronic data processing equipment and software	47,102
Investment income due and accrued	18,997,674
Other assets	5,203,942
Total Assets	<u><u>\$1,732,544,110</u></u>

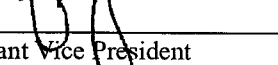
LIABILITIES AND SURPLUS

Losses	\$310,752,443
Loss adjustment expense	79,546,495
Contingent and other commissions payable	6,404,001
Other expense	1,046,332
Taxes, licenses and fees	1,652,483
Unearned premiums	249,533,795
Other liabilities	31,210,018
Total Liabilities	<u><u>680,145,567</u></u>

Surplus Account:	
Capital paid up	\$4,000,000
Gross paid in and contributed surplus	280,071,836
Unassigned funds	<u>768,326,707</u>
Surplus as regards policyholders	<u>\$1,052,398,543</u>
Total Liabilities and Capital	<u><u>\$1,732,544,110</u></u>

I, OJ B. Magana, Assistant Vice President of Western Surety Company hereby certify that the above is an accurate representation of the financial statement of the Company dated December 31, 2012, as filed with the various Insurance Departments and is a true and correct statement of the condition of Western Surety Company as of that date.

Western Surety Company

By 
Assistant Vice President

Subscribed and sworn to me this 25th day of March, 2013.

My commission expires:




Notary Public



Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 1)
Bond #58657507

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

Oliveira Contracting, Inc.

15 Albertson Avenue

Albertson, NY 11507

hereinafter referred to as the "Principal", and _____

Western Surety Company

PO Box 5077

Sioux Falls, SD 57117

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

Eighteen Million Four Hundred Seven Thousand Eight Hundred Fourteen and 00/100

(\$18,407,814.00) 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
FMS ID: S195-227S - E-PIN: 85013B0016001 - DDC PIN: 8502014TR0001C - Spring Street Salt
Shed Construction - Borough of Manhattan

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



Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 2)

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 in full force and effect.

This bond is subject to the following additional conditions, limitations and agreements:

(a) The Principal and Surety (Sureties) agree that this bond shall be for the benefit of any materialmen or laborer having a just claim, as well as the City itself.

(b) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety (Sureties) herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute the suit to judgment and execution without the necessity of joining with any other persons as party plaintiff.

(c) The Principal and Surety (Sureties) agree that neither of them will hold the City liable for any judgment for costs of otherwise, obtained by either or both of them against a laborer or materialman in a suit brought by either a laborer or materialman under this bond for moneys allegedly due for performing work or furnishing material.

(d) The Surety (Sureties) or its successors and assigns shall not be liable for any compensation recoverable by an employce or laborer under the Workmen's Compensation Law.

(e) In no event shall the Surety (Sureties), or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself and his successors and assigns, and the Surety (Sureties), for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the City to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed rendered, or furnished as aforesaid upon the ground that there is no law authorizing the City to require the foregoing provisions to be placed in this bond.

And the Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties), and its bonds shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or of the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due to become due thereunder and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, Subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done or in relation to said Principal.



Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this 27th day of February, 2014.

(Seal) _____ Oliveira Contracting, Inc. (L.S.)
Principal
By: [Signature]
Carmelina Oliveira, President

(Seal) _____ Western Surety Company
Surety
By: [Signature]
Robert Kempner, 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 a duly authorized officer, agent, or attorney-in-fact.

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



Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 4)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Nassau ss:

On this 27th day of February, 2014 before me personally came Carmelina Oliveira to me known, who, being by me duly sworn did depose and say that he resides at Levittown, NY

that he is the President of the Oliveira Contracting, Inc 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.

LYNN ANN INFANTI
Notary Public, State of New York
No. 01IN6004351
Qualified in Suffolk County
Commission Expires March 23, 2018

[Signature]
Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____ before me personally appeared _____ to me known, and known to me to be one of the members of the firm of _____ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____ before me personally appeared _____ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

* * * * *

Affix Acknowledgments and Justification of Sureties



ACKNOWLEDGEMENT OF PRINCIPAL, OF A CORPORATION

STATE OF _____

ss:

COUNTY OF _____

On this _____ day of _____, _____ before me personally came _____ to me known, who, being by me duly sworn did depose and say that he resides at _____ that he is the _____ 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 the foregoing instrument is such seal; that it was an affixed by order of the board of directors of said corporation; and that he signed his name thereto by like order.

Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF New York

ss:

COUNTY OF Nassau

On this 27th day of February, 2014, before me personally came Robert Kempner to me known, who, being by me duly sworn, did depose and say that he is an Attorney-In-Fact of Western Surety Company the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed and said instrument and affixed the said seal as Attorney-In-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

LYNN ANN INFANTI
Notary Public, State of New York
No. 011N6004361
Qualified in Suffolk County
Commission Expires March 23, 2018



My commission expires _____

Notary Public



Western Surety Company

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That WESTERN SURETY COMPANY, a South Dakota corporation, is a duly organized and existing corporation having its principal office in the City of Sioux Falls, and State of South Dakota, and that it does by virtue of the signature and seal herein affixed hereby make, constitute and appoint

Susan P Hammel, Joseph Sfozo, Robert Kempner, Robert W O Kane, Individually

of Plainview, NY, its true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on its behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind it thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of the corporation and all the acts of said Attorney, pursuant to the authority hereby given, are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law printed on the reverse hereof, duly adopted, as indicated, by the shareholders of the corporation.

In Witness Whereof, WESTERN SURETY COMPANY has caused these presents to be signed by its Vice President and its corporate seal to be hereto affixed on this 10th day of October, 2013.

WESTERN SURETY COMPANY

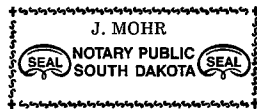


Paul T. Bruflat
Paul T. Bruflat, Vice President

State of South Dakota }
County of Minnehaha } ss

On this 10th day of October, 2013, before me personally came Paul T. Bruflat, to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is the Vice President of WESTERN SURETY COMPANY described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporation.

My commission expires
June 23, 2015



J. Mohr
J. Mohr, Notary Public

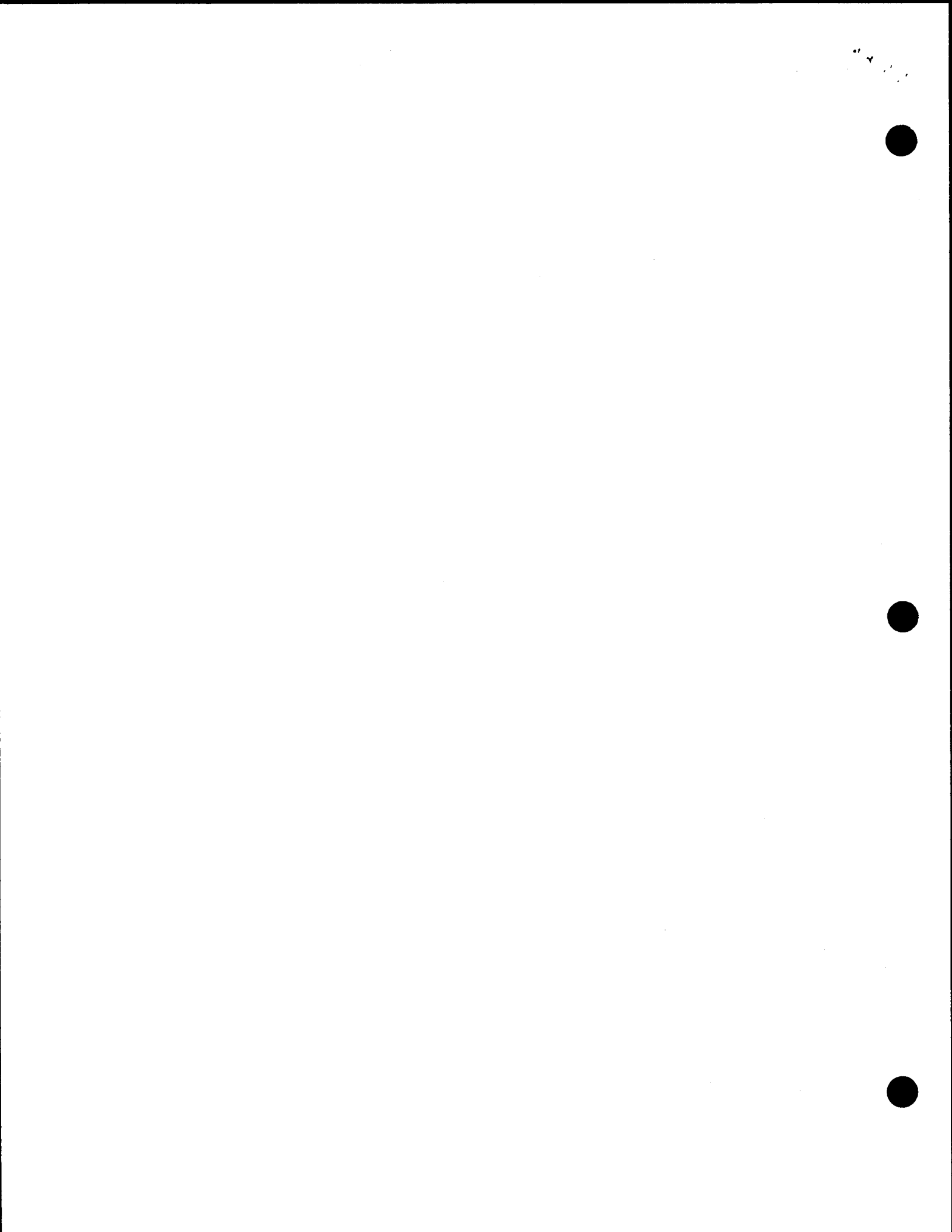
CERTIFICATE

I, L. Nelson, Assistant Secretary of WESTERN SURETY COMPANY do hereby certify that the Power of Attorney hereinabove set forth is still in force, and further certify that the By-Law of the corporation printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporation this 27th day of February, 2014



WESTERN SURETY COMPANY

L. Nelson
L. Nelson, Assistant Secretary



WESTERN SURETY COMPANY
Sioux Falls, South Dakota
Statement of Net Admitted Assets and Liabilities
December 31, 2012

ASSETS

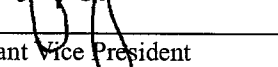
Bonds	\$1,544,217,378
Stocks	23,405,721
Cash and short-term investments	85,332,658
Uncollected premiums and agents' balances	32,034,747
Amounts recoverable from reinsurers	163,180
Net deferred tax asset	23,141,708
Electronic data processing equipment and software	47,102
Investment income due and accrued	18,997,674
Other assets	5,203,942
Total Assets	<u><u>\$1,732,544,110</u></u>

LIABILITIES AND SURPLUS

Losses	\$310,752,443
Loss adjustment expense	79,546,495
Contingent and other commissions payable	6,404,001
Other expense	1,046,332
Taxes, licenses and fees	1,652,483
Unearned premiums	249,533,795
Other liabilities	31,210,018
Total Liabilities	<u><u>680,145,567</u></u>
Surplus Account:	
Capital paid up	\$4,000,000
Gross paid in and contributed surplus	280,071,836
Unassigned funds	768,326,707
Surplus as regards policyholders	\$1,052,398,543
Total Liabilities and Capital	<u><u>\$1,732,544,110</u></u>

I, OI B. Magana, Assistant Vice President of Western Surety Company hereby certify that the above is an accurate representation of the financial statement of the Company dated December 31, 2012, as filed with the various Insurance Departments and is a true and correct statement of the condition of Western Surety Company as of that date.


Western Surety Company

By 
Assistant Vice President

Subscribed and sworn to me this 25th day of March, 2013.

My commission expires:

"OFFICIAL SEAL"
KATHLEEN M. SCHROEDER
Notary Public, State of Illinois
My Commission Expires 08/16/15


Notary Public



Performance Bond #1 (Pages 80 to 83): 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 2)

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to (1) pay the City the cost to complete the contract as determined by the City in excess of the balance of the Contract held by the City, plus any damages or costs to which the City is entitled, up to the full amount of the above penal sum, (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof, or (3) tender a completion Contractor that is acceptable to the City. The Surety (Sureties) further agrees, at its option, either to notify the City that it elects to pay the city the cost of completion plus any applicable damages and costs under option (1) above, or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and, if the Surety elects to fully perform and complete the Work, then to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. If the Surety elects to tender payment pursuant to (1) above, then the Surety shall tender such amount within fifteen (15) business days notification from the City of the cost of completion. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and complete all Work as provided herein, or to tender a completion contractor.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, and waivers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to subcontractors shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal. Notwithstanding the above, if the City makes payments to the Principal before the time required by the contract that in the aggregate exceed \$100,000 or 10% of the Contract price, whichever is less, and that have not become earned prior to the Principal being found to be in default, then all payments made to the Principal before the time required by the Contract shall be added to the remaining contract value available to be paid for the completion of the Contract as if such sums had not been paid to the Principal, but shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and to complete all Work as provided herein, or to tender a completion contractor.

Performance Bond #1 (Pages 80 to 83): 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 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this _____ day of _____, _____.

(Seal) _____ (L.S.)
Principal

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 a duly authorized officer, agent, or attorney-in-fact.

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

Performance Bond #1 (Pages 80 to 83): 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 4)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally came _____ to me known, who, being by me duly sworn did depose and say that he resides at _____ that he is the _____ 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

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, _____ before me personally appeared _____ to me known, and known to me to be one of the members of the firm of _____ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, _____ before me personally appeared _____ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

* * * * *

Affix Acknowledgments and Justification of Sureties

Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

hereinafter referred to as the "Principal", and _____

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

(\$ _____) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

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

Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page2)

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to either (1) pay the full amount of the above penal sum in complete discharge and exoneration of this bond and of all the liabilities of the Surety relating to this bond, or (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof. The Surety (Sureties) further agrees, at its option, either to tender the penal sum or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to commence and to complete all Work as provided herein.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any Work to be performed or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.

Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this _____ day of _____, _____.

(Seal) _____ (L.S.)
Principal

By: _____

(Seal) _____
Surety

By: _____

(Seal) _____
Surety

By: _____

(Seal) _____
Surety

By: _____

(Seal) _____
Surety

By: _____

(Seal) _____
Surety

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 a duly authorized officer, agent, or attorney-in-fact.

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

Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____, 20____ before me personally came _____ to me known, who, being by me duly sworn did depose and say that he/she resides at _____; that he/she is the _____ of _____ the corporation described in and which executed the foregoing instrument; and that he signed his name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, 20____ before me personally came _____ to me known, who, being by me duly sworn did depose and say that he/she resides at _____; that he/she is _____ partner of _____, a limited/general partnership existing under the laws of the State of _____, the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, 20____ before me personally came _____ to me known, who, being by me duly sworn did depose and say that he/she resides at _____, and that he/she is the individual whose name is subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument, said individual executed the instrument.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

* * * * *

Affix Acknowledgments and Justification of Sureties.

Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 1)

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

hereinafter referred to as the "Principal", and _____

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

(\$ _____) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

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

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns 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

Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 2)

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 in full force and effect.

This bond is subject to the following additional conditions, limitations and agreements:

(a) The Principal and Surety (Sureties) agree that this bond shall be for the benefit of any materialmen or laborer having a just claim, as well as the City itself.

(b) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety (Sureties) herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute the suit to judgment and execution without the necessity of joining with any other persons as party plaintiff.

(c) The Principal and Surety (Sureties) agree that neither of them will hold the City liable for any judgment for costs of otherwise, obtained by either or both of them against a laborer or materialman in a suit brought by either a laborer or materialman under this bond for moneys allegedly due for performing work or furnishing material.

(d) The Surety (Sureties) or its successors and assigns shall not be liable for any compensation recoverable by an employee or laborer under the Workmen's Compensation Law.

(e) In no event shall the Surety (Sureties), or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself and his successors and assigns, and the Surety (Sureties), for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the City to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed rendered, or furnished as aforesaid upon the ground that there is no law authorizing the City to require the foregoing provisions to be placed in this bond.

And the Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties), and its bonds shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or of the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due to become due thereunder and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, Subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done or in relation to said Principal.

Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 3)

IN WITNESS HEREOF, 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 _____, _____.

(Seal) _____ (L.S.)
Principal

By: _____

(Seal) _____
Surety

By: _____

(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 a duly authorized officer, agent, or attorney-in-fact.

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

Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 4)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____, _____ before me personally came to me known, who, being by me duly sworn did depose and say that he resides at _____ that he is the _____ 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

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, _____ before me personally appeared to me known, and known to me to be one of the members of the firm of _____ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, _____ before me personally appeared to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

* * * * *

Affix Acknowledgments and Justification of Sureties

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

LABOR LAW §220 PREVAILING WAGE SCHEDULE

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 Labor Law §220 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 contracts.

Contracting agencies anticipating doing work which requires the employment of a trade or classification not included in this schedule must request the Comptroller to establish a proper classification for the work pursuant to Labor Law §220 (3-a) (a). The prevailing rate schedule as promulgated by the Comptroller, must, in compliance with law, be annexed to and form part of the contract.

Contractors are solely responsible for maintaining original payroll records which delineate, among other things, the hours each employee worked within a given classification. Contractors using rates and/or classifications not promulgated by the Comptroller do so at their own risk. Additionally, prior to bid, Agency Chief Contracting Officers must contact the Bureau of Labor Law when the need arises for a work classification not published in this schedule.

The appropriate schedule of prevailing wages and benefits must be posted at all public work sites pursuant to Labor Law §220 (3-a) (a).

This schedule is applicable for work performed during the effective period, unless otherwise noted. You will be notified of any changes to this schedule by addenda published on our web site at www.comptroller.nyc.gov. The rate of wages and supplemental benefits to be paid or provided are those that prevail at the time the work is being performed. Preliminary schedules for future one-year periods are published annually in the City Record on or about June 1st of each succeeding year. Final schedules are published on or about July 1st in the City Record and on our web site at www.comptroller.nyc.gov.

The Comptroller's Office has attempted to include all overtime, shift and night differential, Holiday, Saturday, Sunday or other premium time work. However, this schedule does not set forth every prevailing practice with respect to such rates with which employers must comply. All such practices are nevertheless part of the employer's prevailing wage obligation and contained in the collective bargaining agreements of the prevailing wage unions. These collective bargaining agreements are available for inspection by appointment. Requests for appointments may be made by calling (212) 669-4443, Monday through Friday between the hours of 9 a.m. and 5 p.m.

Answers to questions concerning prevailing trade practices may be obtained from the Classification Unit by calling (212) 669-7974. Please direct all other compliance issues to: Bureau of Labor Law, Attn: Wasyl Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 1122, New York, N.Y. 10007; Fax (212) 669-4002.

Prevailing rates and ratios for apprentices are attached to this schedule in the Appendix. 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 employed on a public work project. Workers who are not journey persons or not registered apprentices pursuant to Labor Law §220 (3-e) may not be substituted for apprentices and must be paid as journey persons.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Contractors are advised to review the applicable Collective Bargaining Agreements and the Comptroller's Prevailing Wage Schedule before bidding on Public Work. If there are any questions concerning prevailing wages, benefits, overtime, Holiday pay, shift differentials or any prevailing practice, please contact this office.

Public Work construction, reconstruction, demolition, excavation, rehabilitation, repair, renovation, alteration, or improvement contracts 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 <http://www.nyc.gov/html/mocs/html/vendors/pla.shtml>.

All the provisions of Labor Law section 220 remain applicable to PLA work including, but not limited to, the enforcement of prevailing wage requirements by the Comptroller; however, we will enforce shift, premium, overtime and other non-standard rates as they appear in a project's pre-negotiated labor agreement.

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.

In order to meet their obligation to provide prevailing supplemental benefits to each covered employee, employers must either:

- 1) Provide bona-fide 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 benefits and wage supplements which cost the employer no less than the prevailing supplemental benefits rate in total.

Particular attention should be given to the supplemental benefits requirement. Although in most instances the payment or provision for supplemental benefits is for each hour worked, some classifications require the payment or provision of supplemental benefits for each hour paid. Consequently, some prevailing practices require benefits to be purchased at the overtime, shift differential, Holiday, Saturday, Sunday or other premium time rate.

Benefits are paid for EACH HOUR WORKED unless otherwise noted.

Wasył Kinach, P.E.
Director of Classifications
Bureau of Labor Law

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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ASBESTOS HANDLER

(Hazardous Material; Disturbs, removes, encapsulates, repairs, or encloses friable asbestos material)

Asbestos Handler

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$35.90**

Supplemental Benefit Rate per Hour: **\$15.05**

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 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)

BLASTER

Blaster

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$44.40**

Supplemental Benefit Rate per Hour: **\$38.44**

Blaster (Hydraulic)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$45.17**

Supplemental Benefit Rate per Hour: **\$38.44**

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Blaster - Trac Drill Hydraulic

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$40.04**
Supplemental Benefit Rate per Hour: **\$38.44**

Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$39.30**
Supplemental Benefit Rate per Hour: **\$38.44**

Blaster - Operators of Jack Hammers

Chippers: Spaders: Concrete Breakers: and all other pneumatic tools of like usage: Walk Behind Self Propelled Hydraulic Asphalt and Concrete Breakers: Hydro (Water) Demolition

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$38.32**
Supplemental Benefit Rate per Hour: **\$38.44**

Blaster - Powder Carriers

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$34.66**
Supplemental Benefit Rate per Hour: **\$38.44**

Blaster - Hydraulic Trac Drill Chuck Tender

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$33.46**
Supplemental Benefit Rate per Hour: **\$38.44**

Blaster - Chuck Tender & Nipper

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$32.75**
Supplemental Benefit Rate per Hour: **\$38.44**

Blaster - Magazine Keepers: (Watch Person)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$19.76**
Supplemental Benefit Rate per Hour: **\$38.44**

Overtime Description

Magazine Keepers:
Time and one half for work performed in excess of forty (40) hours per week and for work performed on Saturdays, Sundays and Holidays.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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All Other Employees:

Time and one-half for the first eight hours of work on Saturday and for Make-up Time. Double time for all hours over eight Monday through Friday (except make-up hours) and for all hours worked on Sunday and Holidays.

Overtime

Double time 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

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

A single shift shall be 8 hours plus an unpaid lunch, starting at 8:00 A.M (or between 6:00 A.M. and 10:00 A.M. on weekdays). When two (2) shifts are employed, each shift shall be 8 hours plus ½ hour unpaid lunch. When three (3) shifts are employed, each shift will work seven and one-half (7 ½) hours, but will be paid for eight (8) hours, since only one-half (½) hour is allowed for mealtime. When two (2) or more shifts are employed, single time will be paid for each shift. The first 8 hours of any and all work performed Monday through Friday inclusive of any off-shift shall be at the single time rate.

(Local #29)

BOILERMAKER

Boilermaker

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$49.47**

Supplemental Benefit Rate per Hour: **\$39.78**

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - \$59.08; For double overtime - \$78.37.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$50.45**

Supplemental Benefit Rate per Hour: **\$41.31**

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - \$61.37; For double overtime - \$81.43.

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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

When shifts are required, the first shift shall work eight (8) hours at the regular straight-time hourly rate. The second shift shall work seven and one-half (7 ½) hours and receive eight hours at the regular straight time hourly rate plus twenty-five cents (\$0.25) per hour. The third shift shall work seven (7) hours and receive eight hours at the regular straight time hourly rate plus fifty cents (\$0.50) per hour. A thirty (30) minute lunch period shall not be considered as time worked. Work in excess of the above shall be paid overtime at the appropriate new construction work or repair work overtime wage and supplemental benefit hourly rate.

(Local #5)

BRICKLAYER

Bricklayer

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$46.44**

Supplemental Benefit Rate per Hour: **\$27.53**

Overtime

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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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.

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

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

Overtime rates to be paid outside the regular scheduled work day.

(Bricklayer District Council)

CARPENTER - BUILDING COMMERCIAL

Building Commercial

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$48.08

Supplemental Benefit Rate per Hour: \$41.10

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

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

Columbus Day

Presidential Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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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.

(Carpenters District Council)

**CARPENTER - HEAVY CONSTRUCTION WORK
(Construction of Engineering Structures and Building Foundations)**

Heavy Construction Work

Effective Period: 7/1/2013 - 7/17/2013

Wage Rate per Hour: **\$46.74**

Supplemental Benefit Rate per Hour: **\$42.37**

Effective Period: 7/18/2013 - 6/30/2014

Wage Rate per Hour: **\$46.82**

Supplemental Benefit Rate per Hour: **\$44.97**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

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Off shift work, commencing between 5:00 P.M. and 10:00 P.M. shall work eight and one half hours allowing for one half hour for lunch, but will be paid for 9 hours including benefits at the straight time rate for 8 hours.

(Carpenters District Council)

CEMENT & CONCRETE WORKER

Cement & Concrete Worker

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$42.33**

Supplemental Benefit Rate per Hour: **\$26.17**

Supplemental Note: **\$28.92** on Saturdays; **\$31.67** 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)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

CEMENT MASON

Cement Mason

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$38.63**

Supplemental Benefit Rate per Hour: **\$39.05**

Supplemental Note: Overtime supplemental benefit rate per hour: **\$57.55**

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.

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 an off shift day, (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. Four Days a week at Ten (10)hour day.

(Local #780)

CORE DRILLER

Core Driller

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$35.44**

Supplemental Benefit Rate per Hour: **\$19.75**

Core Driller Helper

Effective Period: 7/1/2013 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Wage Rate per Hour: \$28.60
Supplemental Benefit Rate per Hour: \$19.75

Core Driller Helper(Third year in the industry)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$25.74
Supplemental Benefit Rate per Hour: \$19.75

Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$22.88
Supplemental Benefit Rate per Hour: \$19.75

Core Driller Helper (First year in the industry)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$20.02
Supplemental Benefit Rate per Hour: \$19.75

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

The shift day shall be the continuous eight and one-half (8½) hours from 6:00 A.M. to 2:30 P.M. and from 2:30 P.M. to 11:00 P.M., including one-half (½) hour of employees regular rate of pay for lunch. 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 seventy-five cents (\$0.75) 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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$40.50

Supplemental Benefit Rate per Hour: \$42.07

Supplemental Note: The above supplemental rate applies for work performed in Manhattan, Bronx, Brooklyn and Queens. \$43.49 - For work performed in Staten Island.

Derrick Person & Rigger - Site Work

For site work where no rigging is involved.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$30.00

Supplemental Benefit Rate per Hour: \$31.32

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. Deduct \$1.42 from the Staten Island hourly benefits rate before computing overtime.

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$59.40

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Supplemental Benefit Rate per Hour: \$44.97

Diver Tender (Marine)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$42.05

Supplemental Benefit Rate per Hour: \$44.97

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$46.82

Supplemental Benefit Rate per Hour: \$44.97

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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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 but will be paid 113% of the straight time hourly wage and the straight time supplemental benefits.

(Carpenters District Council)

DRIVER: TRUCK (TEAMSTER)

Driver - Automobile Chauffeur (Dump Truck)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.11

Supplemental Benefit Rate per Hour: \$40.20

Driver - Heavy Equipment Trailer Driver

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$39.61

Supplemental Benefit Rate per Hour: \$40.20

Note: For time and one half overtime Wage Rate - \$57.16; for double time overtime Wage Rate - \$76.21

Driver - Euclid & Turnapull Operator

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.67

Supplemental Benefit Rate per Hour: \$40.20

Driver - Six Wheeler(3 Axle) Tractors & Trailers

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Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$39.11**

Supplemental Benefit Rate per Hour: **\$40.20**

Note: For time and one half overtime Wage Rate - \$58.01; for double time overtime Wage Rate - \$77.34

Driver - Boom Truck

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$39.36**

Supplemental Benefit Rate per Hour: **\$40.20**

Note: For time and one half overtime Wage Rate - \$58.01; for double time overtime Wage Rate - \$77.34

Overtime Description

For Paid Holidays: Holiday pay for all holidays shall be prorated based two hours per day for each day worked in the holiday week, not to exceed 8 hours of holiday pay. For Thanksgiving week, the prorated share shall be 5 1/3 hours of holiday pay for each day worked in Thanksgiving week.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Driver - Redi-Mix Driver (Sand & Gravel)

Effective Period: 7/1/2013 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Wage Rate per Hour: **\$35.71**

Supplemental Benefit Rate per Hour: **\$37.27**

Overtime Description

For Paid Holidays: Employees working two (2) days in the calendar week in which the holiday falls are to paid for these holidays, provided they shape each remaining workday during that calendar 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).

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

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Thanksgiving Day

Christmas Day

(Local #282)

ELECTRICIAN

(Including all low voltage cabling carrying data; video; and voice in combination with data and or video.)

Electrician "A" (Regular Day)

Effective Period: 7/1/2013 - 5/13/2014

Wage Rate per Hour: **\$52.00**

Supplemental Benefit Rate per Hour: **\$46.13**

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Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: \$53.00
Supplemental Benefit Rate per Hour: \$47.54

Electrician "A" (Regular Day Overtime)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: \$78.00
Supplemental Benefit Rate per Hour: \$49.39

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: \$79.50
Supplemental Benefit Rate per Hour: \$50.86

Electrician "A" (Day Shift)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: \$52.00
Supplemental Benefit Rate per Hour: \$46.13

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: \$53.00
Supplemental Benefit Rate per Hour: \$47.54

Electrician "A" (Day Shift Overtime After 8 hours)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: \$78.00
Supplemental Benefit Rate per Hour: \$49.39

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: \$79.50
Supplemental Benefit Rate per Hour: \$50.86

Electrician "A" (Swing Shift)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: \$61.01
Supplemental Benefit Rate per Hour: \$52.47

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: \$62.19
Supplemental Benefit Rate per Hour: \$54.07

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

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: \$91.52
Supplemental Benefit Rate per Hour: \$56.30

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Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$93.29**
Supplemental Benefit Rate per Hour: **\$57.97**

Electrician "A" (Graveyard Shift)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$68.34**
Supplemental Benefit Rate per Hour: **\$57.83**

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$69.66**
Supplemental Benefit Rate per Hour: **\$59.59**

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

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$102.51**
Supplemental Benefit Rate per Hour: **\$62.11**

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$104.49**
Supplemental Benefit Rate per Hour: **\$63.96**

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

When so elected by the Employer, one or more shifts of at least five days duration may be scheduled as follows:
Day Shift: 8:00 am to 4:30 pm, Swing Shift 4:30 pm to 12:30 am, Graveyard Shift: 12:30 am to 8:00 am.

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§220 PREVAILING WAGE SCHEDULE

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.

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: 7/1/2013 - 5/13/2014

Wage Rate per Hour: **\$26.50**

Supplemental Benefit Rate per Hour: **\$19.56**

First and Second Year "M" Wage Rate Per Hour - Hired on or before 5/10/07: **\$25.80**

First and Second Year "M" Supplemental Rate- Hired on or before 5/10/07: **\$19.21**

First and Second Year "M" Wage Rate Per Hour - Hired after 5/10/07: **\$22.00**

First and Second Year "M" Supplemental Rate- Hired after 5/10/07: **\$17.30**

Effective Period: 5/14/2014 - 6/30/2014

Wage Rate per Hour: **\$27.00**

Supplemental Benefit Rate per Hour: **\$20.32**

First and Second Year "M" Wage Rate Per Hour - Hired on or before 5/10/07: **\$26.30**

First and Second Year "M" Supplemental Rate- Hired on or before 5/10/07: **\$19.96**

First and Second Year "M" Wage Rate Per Hour - Hired after 5/10/07: **\$22.50**

First and Second Year "M" Supplemental Rate- Hired after 5/10/07: **\$18.06**

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: 7/1/2013 - 5/13/2014

Wage Rate per Hour: **\$39.75**

Supplemental Benefit Rate per Hour: **\$21.23**

First and Second Year "M" Wage Rate Per Hour - Hired on or before 5/10/07: **\$38.70**

First and Second Year "M" Supplemental Rate- Hired on or before 5/10/07: **\$20.83**

First and Second Year "M" Wage Rate Per Hour - Hired after 5/10/07: **\$33.00**

First and Second Year "M" Supplemental Rate- Hired after 5/10/07: **\$18.68**

Effective Period: 5/14/2014 - 6/30/2014

Wage Rate per Hour: **\$40.50**

Supplemental Benefit Rate per Hour: **\$21.01**

First and Second Year "M" Wage Rate Per Hour - Hired on or before 5/10/07: **\$39.45**

First and Second Year "M" Supplemental Rate- Hired on or before 5/10/07: **\$21.61**

First and Second Year "M" Wage Rate Per Hour - Hired after 5/10/07: **\$33.75**

First and Second Year "M" Supplemental Rate- Hired after 5/10/07: **\$19.47**

Overtime

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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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$30.40**

Supplemental Benefit Rate per Hour: **\$13.90**

Supplemental Note: \$12.40 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.
Double time the regular rate for Sunday.

Paid Holidays

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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 8:00 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

(Local #3)

ELECTRICIAN-STREET LIGHTING WORKER

Electrician - Electro Pole Electrician

Effective Period: 7/1/2013 - 5/20/2014
Wage Rate per Hour: **\$52.00**
Supplemental Benefit Rate per Hour: **\$47.90**

Effective Period: 5/21/2014 - 6/30/2014
Wage Rate per Hour: **\$53.00**
Supplemental Benefit Rate per Hour: **\$49.34**

Electrician - Electro Pole Foundation Installer

Effective Period: 7/1/2013 - 5/20/2014
Wage Rate per Hour: **\$39.42**
Supplemental Benefit Rate per Hour: **\$36.46**

Effective Period: 5/21/2014 - 6/30/2014
Wage Rate per Hour: **\$40.18**
Supplemental Benefit Rate per Hour: **\$37.73**

Electrician - Electro Pole Maintainer

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Effective Period: 7/1/2013 - 5/20/2014

Wage Rate per Hour: **\$33.75**

Supplemental Benefit Rate per Hour: **\$32.83**

Effective Period: 5/21/2014 - 6/30/2014

Wage Rate per Hour: **\$34.40**

Supplemental Benefit Rate per Hour: **\$34.00**

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$57.01**

Supplemental Benefit Rate per Hour: **\$34.48**

Overtime Description

For New Construction: work performed after 7 or 8 hour day, Saturday, Sunday or between 4:30pm and 7:00am shall be paid at double time rate.

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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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.14

Supplemental Benefit Rate per Hour: \$33.02

Overtime Description

For Service Work: Double time - all work 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

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Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

For Modernization Work (4pm to 12:30am) - regularly hourly rate plus a (15%) fifteen percent differential.

Vacation

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

ENGINEER

Engineer - Heavy Construction Operating Engineer I

Cherry pickers 20 tons and over and Loaders (rubber tired and/or tractor type with a manufacturer's minimum rated capacity of six cubic yards and over).

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$61.05**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: **\$57.46** on overtime

Shift Wage Rate: **\$97.68**

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-A-alls, Meyers Machines, John Beam and machines of a similar nature, Ross Carriers and Travel Lifts and machines of a similar nature, Bulldozers, Scrapers and Turn-a-Pulls: Tugger Hoists (Used exclusively for handling excavated material); Tractors with attachments, Hyster and Roustabout Cranes, Cherry pickers. Austin Western, Grove and machines of a similar nature, Scoopmobiles, Monorails, Conveyors, Trenchers: Loaders-Rubber Tired and Tractor: Barber Greene and Eimco Loaders and Eimco Backhoes; Mighty Midget and similar breakers and Tampers, Curb and Gutter Pavers and Motor Patrol, Motor Graders and all machines of a similar nature. Locomotives 10 Tons or under. Mini-Max, Break-Tech and machines of a similar nature; Milling machines, robotic and demolition machines and machines of a similar nature, shot blaster, skid steer machines and machines of a similar nature including bobcat, pile rig rubber-tired excavator (37,000 lbs. and under), 2 man auger.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$59.24**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: **\$57.46** on overtime

Shift Wage Rate: **\$94.78**

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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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$56.22**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: **\$57.46** on overtime

Shift Wage Rate: **\$89.95**

Engineer - Heavy Construction Maintenance Engineer I

Installing, Repairing, Maintaining, Dismantling and Manning of all equipment including Steel Cutting, Bending and Heat Sealing Machines, Mechanical Heaters, Grout Pumps, Bentonite Pumps & Plants, Screening Machines, Fusion Coupling Machines, Tunnel Boring Machines Moles and Machines of a similar nature, Power Packs, Mechanical Hydraulic Jacks; all drill rigs including but not limited to Churn, Rotary Caisson, Raised Bore & Drills of a similar nature; Personnel, Inspection & Safety Boats or any boats used to perform functions of same, Mine Hoists, Whirlies, all Climbing Cranes, all Tower Cranes, including but not limited to Truck Mounted and Crawler Type and machines of similar nature; Maintaining Hydraulic Drills and machines of a similar nature; Well Point System-Installation and dismantling; Burning, Welding, all Pumps regardless of size and/or motor power, except River Cofferdam Pumps and Wells Point Pumps; Motorized Buggies (three or more); equipment used in the cleaning and televising of sewers, but not limited to jet-rodder/vacuum truck, vacall/vactor, closed circuit television inspection equipment; high powered water pumps, jet pumps; screed machines and concrete finishing machines of a similar nature; vermeers.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$58.97**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: **\$57.46** on overtime

Shift Wage Rate: **\$94.35**

Engineer - Heavy Construction Maintenance Engineer II

On Base Mounted Tower Cranes

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$77.30**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: **\$57.46** on overtime

Shift Wage Rate: **\$123.68**

Engineer - Heavy Construction Maintenance Engineer III

On Generators, Light Towers

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$39.10**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: **\$57.46** on overtime

Shift Wage Rate: **\$62.56**

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§220 PREVAILING WAGE SCHEDULE

Engineer - Heavy Construction Maintenance Engineer IV

On Pumps and Mixers including mud sucking

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$40.11

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$64.18

Engineer - Heavy Construction Oilers I

Gradalls, Cold Planer Grader, Concrete Pumps, Driving Truck Cranes, Driving and Operating Fuel and Grease Trucks.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$53.22

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$85.15

Engineer - Heavy Construction Oilers II

All gasoline, electric, diesel or air operated Shovels, Draglines, Backhoes, Keystones, Pavers, Guniting Machines, Battery of Compressors, Crawler Cranes, two-person Trenching Machines.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$36.97

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$59.15

Engineer - Steel Erection Maintenance Engineers

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$57.05

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$91.28

Engineer - Steel Erection Oiler I

On a Truck Crane

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$53.43

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$85.49

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Engineer - Steel Erection Oiler II

On a Crawler Crane

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$40.84**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: **\$57.46** on overtime

Shift Wage Rate: **\$65.34**

Overtime Description

On jobs of more than one shift, if the next shift employee fails to report for work through any cause over which the employer has no control, the employee on duty who works the next shift continues to work at the single time rate.

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

Engineer - Building Work Maintenance Engineers I

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$54.04**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: **\$57.46** on overtime

Engineer - Building Work Maintenance Engineers II

On Pumps, Generators, Mixers and Heaters

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$42.10**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: \$57.46 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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$51.40**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: \$57.46 on overtime

Engineer - Building Work Oilers II

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

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$38.31**

Supplemental Benefit Rate per Hour: **\$31.93**

Supplemental Note: \$57.46 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

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

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Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

Shift Rates

Off Shift: double time the regular hourly rate.

(Local #15)

ENGINEER - CITY SURVEYOR AND CONSULTANT

Party Chief

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$35.55**

Supplemental Benefit Rate per Hour: **\$17.65**

Instrument Person

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$29.41**

Supplemental Benefit Rate per Hour: **\$17.65**

Rodperson

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$25.54**

Supplemental Benefit Rate per Hour: **\$17.65**

Overtime Description

Overtime Benefit Rate - \$23.63 per hour (time & one half) \$29.95 per hour (double time).

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$55.40**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime Benefit Rate - \$42.73 per hour (time & one half) \$54.84 per hour (double time).

Field Engineer - BC Instrument Person

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$43.10**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime Benefit Rate - \$42.73 per hour (time & one half) \$54.84 per hour (double time).

Field Engineer - BC Rodperson

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$27.96**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime Benefit Rate - \$42.73 per hour (time & one half) \$54.84 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)

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§220 PREVAILING WAGE SCHEDULE

ENGINEER - FIELD (HEAVY CONSTRUCTION)
(Construction of Roads, Tunnels, Bridges, Sewers, Building Foundations,
Engineering Structures etc.)

Field Engineer - HC Party Chief

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$62.61**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

Field Engineer - HC Instrument Person

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$46.00**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

Field Engineer - HC Rodperson

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$38.61**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$58.50**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

Field Engineer - Steel Erection Instrument Person

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$45.53**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

Field Engineer - Steel Erection Rodperson

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$30.43**

Supplemental Benefit Rate per Hour: **\$30.62**

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 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

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§220 PREVAILING WAGE SCHEDULE

Back Filling Machines, Cranes, Mucking Machines and Dual Drum Paver.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$67.70**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$108.32**

Operating Engineer - Road & Heavy Construction II

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

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$70.10**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **51.75** overtime hours

Shift Wage Rate: **\$112.16**

Operating Engineer - Road & Heavy Construction III

Mine Hoists, Cranes, etc. (Used as Mine Hoists)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$72.34**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$115.74**

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$70.63**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$113.01**

Operating Engineer - Road & Heavy Construction V

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

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$69.23**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$110.77**

Operating Engineer - Road & Heavy Construction VI

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$65.76**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours
Shift Wage Rate: **\$105.22**

Operating Engineer - Road & Heavy Construction VII

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

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$53.08**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours
Shift Wage Rate: **\$84.93**

Operating Engineer - Road & Heavy Construction VIII

Utility Compressors

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$41.18**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours
Shift Wage Rate: **\$51.93**

Operating Engineer - Road & Heavy Construction IX

Horizontal Boring Rig

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$62.53**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours
Shift Wage Rate: **\$100.05**

Operating Engineer - Road & Heavy Construction X

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$57.46**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours
Shift Wage Rate: **\$91.94**

Operating Engineer - Road & Heavy Construction XI

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Compressors (Portable 3 or more in battery), Driving of Truck Mounted Compressors, Well-point Pumps, Tugger Machines Well Point Pumps, Churn Drill.

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$44.63
Supplemental Benefit Rate per Hour: \$28.60
Supplemental Note: \$51.75 overtime hours
Shift Wage Rate: \$71.41

Operating Engineer - Road & Heavy Construction XII

All Drills and Machines of a similar nature.

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$66.45
Supplemental Benefit Rate per Hour: \$28.60
Supplemental Note: \$51.75 overtime hours
Shift Wage Rate: \$106.32

Operating Engineer - Road & Heavy Construction XIII

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

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$64.34
Supplemental Benefit Rate per Hour: \$28.60
Supplemental Note: \$51.75 overtime hours
Shift Wage Rate: \$102.94

Operating Engineer - Road & Heavy Construction XIV

Concrete Mixer

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$61.53
Supplemental Benefit Rate per Hour: \$28.60
Supplemental Note: \$51.75 overtime hours
Shift Wage Rate: \$98.45

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: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$41.44
Supplemental Benefit Rate per Hour: \$28.60
Supplemental Note: \$51.75 overtime hours
Shift Wage Rate: \$66.30

Operating Engineer - Road & Heavy Construction XVI

Concrete Breaking Machines, Hoists (Single Drum), Load Masters, Locomotives (over ten tons) and Dinkies over ten tons, Hydraulic Crane-Second Engineer.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$58.74**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.85** overtime hours

Shift Wage Rate: **\$93.98**

Operating Engineer - Road & Heavy Construction XVII

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

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$59.21**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$94.74**

Operating Engineer - Road & Heavy Construction XVIII

Tower Crane

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$85.00**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$136.00**

Operating Engineer - Paving I

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

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$65.76**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$105.22**

Operating Engineer - Paving II

Asphalt Roller

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$64.04**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$102.46**

Operating Engineer - Paving III

Asphalt Plants

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$54.17**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$86.67**

Operating Engineer - Concrete I

Cranes

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$70.32**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Operating Engineer - Concrete II

Compressors

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$41.76**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Operating Engineer - Concrete III

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

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$56.16**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Operating Engineer - Steel Erection I

Three Drum Derricks

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$73.37**

Supplemental Benefit Rate per Hour: **\$28.60**

Supplemental Note: **\$51.75** overtime hours

Shift Wage Rate: **\$117.39**

Operating Engineer - Steel Erection II

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

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§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$70.50**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours
Shift Wage Rate: **\$112.80**

Operating Engineer - Steel Erection III

Compressors, Welding Machines.

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$41.84**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours
Shift Wage Rate: **\$66.94**

Operating Engineer - Steel Erection IV

Compressors - Not Combined with Welding Machine.

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$39.85**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours
Shift Wage Rate: **\$63.76**

Operating Engineer - Building Work I

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

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$57.82**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** 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: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$43.28**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: **\$51.75** overtime hours

Operating Engineer - Building Work III

Double Drum

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Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$65.83**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work IV

Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$69.74**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work V

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$64.26**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work VI

4 Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$63.58**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work VII

Rack & Pinion and House Cars

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$50.53**
Supplemental Benefit Rate per Hour: **\$28.60**
Supplemental Note: \$51.75 overtime hours
For New House Car projects started after 7/1/11 only: Wage Rate per Hour \$40.31

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Double time the regular rate after an 8 hour day.
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.
Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

Shift Rates

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: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$46.15**
Supplemental Benefit Rate per Hour: **\$38.50**

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Columbus Day
Presidential Election Day
Thanksgiving Day
Day after Thanksgiving
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

Two shifts may be utilized with the first shift working 8:00 A.M. to the end of the shift at the straight time of pay. The second shift will receive one hour at double time rate for the last hour of the shift. (eight for seven, nine for eight).

(Carpenters District Council)

GLAZIER (New Construction, Remodeling, and Alteration)

Glazier

Effective Period: 7/1/2013 - 10/31/2013
Wage Rate per Hour: **\$42.00**
Supplemental Benefit Rate per Hour: **\$33.24**
Supplemental Note: Supplemental Benefit Overtime Rate: \$41.24

Effective Period: 11/1/2013 - 6/30/2014
Wage Rate per Hour: **\$42.00**
Supplemental Benefit Rate per Hour: **\$34.09**
Supplemental Note: Supplemental Benefit Overtime Rate: \$42.59

Overtime Description

An optional 8th hour can be worked at straight time rate. If 9th hour is worked, then both hours or more (8th & 9th or more) will be at the double time rate of pay.

Overtime

Double time the regular rate after a 7 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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None.

Shift Rates

Shifts shall be any 7 hours beyond 4:00 P.M. for which the glazier shall receive 8 hours pay for 7 hours worked.

(Local #1281)

GLAZIER - REPAIR & MAINTENANCE

(For the Installation of Glass - All repair and maintenance work on a particular building, whenever performed, where the total cumulative contract value is under \$105,000. Except where enumerated (i.e. plate glass windows) does not apply to non-residential buildings.)

Craft Jurisdiction for repair, maintenance and fabrication

Plate glass replacement, Residential glass replacement, Residential mirrors and shower doors, Storm windows and storm doors, Residential replacement windows, Herculite door repairs, Door closer repairs, Retrofit apartment house (non commercial buildings), Glass tinting.

Effective Period: 7/1/2013 - 4/30/2014

Wage Rate per Hour: **\$23.50**

Supplemental Benefit Rate per Hour: **\$18.54**

Effective Period: 5/1/2014 - 6/30/2014

Wage Rate per Hour: **\$23.60**

Supplemental Benefit Rate per Hour: **\$19.04**

Overtime

Time and one half the regular rate after an 8 hour day.

Double time the regular rate for Sunday.

Time and one half the regular hourly rate after 40 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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

(Local #1281)

HEAT AND FROST INSULATOR

Heat & Frost Insulator

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$56.48**

Supplemental Benefit Rate per Hour: **\$33.31**

Overtime Description

Double time shall be paid for supplemental benefits during overtime work.
8th hour paid at time and one half.

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

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.

Off hour work in occupied or retail buildings may be worked on weekdays with an increment of \$1.00 per hour and eight hours pay for seven (7) hours worked. Double time will apply for over seven (7) hours worked on weekdays, weekends or holidays.

(Local #12)

HOUSE WRECKER (TOTAL DEMOLITION)

House Wrecker - Tier A

On all work sites the first, second, eleventh and every third House Wrecker thereafter shall be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). The 10th and 20th House Wrecker shall be apprentices. Other House Wreckers shall be Tier B House Wreckers.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$34.01

Supplemental Benefit Rate per Hour: \$25.14

House Wrecker - Tier B

On all work sites the first, second, eleventh and every third House Wrecker thereafter shall be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). The 10th and 20th House Wrecker shall be apprentices. Other House Wreckers shall be Tier B House Wreckers.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.75

Supplemental Benefit Rate per Hour: \$18.62

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$42.30**

Supplemental Benefit Rate per Hour: **\$43.54**

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Overtime Description

Time and one half the regular rate after a 7 hour day for a maximum of two hours on any regular work day (the 8th and 9th hour) and double time shall be paid for all work on a regular work day thereafter, time and one half the regular rate for Saturday for the first seven hours of work and double time shall be paid for all work on a Saturday thereafter.

Overtime

Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

For off shift work - 8 hours pay for 7 hours of work. When two or three shifts are employed on a job, Monday through Friday, the workday for each shift shall be seven hours and paid for ten and one-half hours at the single time rate. When two or three shifts are worked on Saturday, Sunday or holidays, each shift shall be seven hours and paid fifteen and three-quarters hours.

(Local #580)

IRON WORKER - STRUCTURAL

Iron Worker - Structural

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$46.75**

Supplemental Benefit Rate per Hour: **\$62.48**

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Overtime Description

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§220 PREVAILING WAGE SCHEDULE

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.

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
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.
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.

(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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$39.25**

Supplemental Benefit Rate per Hour: **\$33.25**

Overtime

Time and one half the regular rate after an 8 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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
Presidential Election 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, as well as tree pruning, tree removing, spraying and maintenance in connection with the planting of street trees and the planting of trees in city parks but not when such activities are performed as part of, or in connection with, other construction or reconstruction projects.)

Landscaper (Above 6 years experience)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$24.25
Supplemental Benefit Rate per Hour: \$12.30

Landscaper (3 - 6 years experience)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$23.25
Supplemental Benefit Rate per Hour: \$12.30

Landscaper (up to 3 years experience)

Effective Period: 7/1/2013 - 6/30/2014

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Wage Rate per Hour: **\$20.75**
Supplemental Benefit Rate per Hour: **\$12.30**

Groundperson

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$20.75**
Supplemental Benefit Rate per Hour: **\$12.30**

Tree Remover / Pruner

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$29.25**
Supplemental Benefit Rate per Hour: **\$12.30**

Landscaper Sprayer (Pesticide Applicator)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$19.25**
Supplemental Benefit Rate per Hour: **\$12.30**

Watering - Plant Maintainer

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$14.25**
Supplemental Benefit Rate per Hour: **\$12.30**

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$49.19**

Supplemental Benefit Rate per Hour: **\$32.24**

Marble Finisher

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$39.05**

Supplemental Benefit Rate per Hour: **\$31.43**

Marble Polisher

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$34.73**

Supplemental Benefit Rate per Hour: **\$24.60**

Overtime Description

Supplemental Benefit contributions are to be made at the applicable overtime rates. Time and one half the regular rate after a 7 hour day or time and one half the regular rate after an 8 hour day - chosen by Employer at the start of the project and then would last for the full duration of the project.

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

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

(Local #7)

MASON TENDER

Mason Tender

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.00

Supplemental Benefit Rate per Hour: \$25.74

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.

(Local #79)

MASON TENDER (INTERIOR DEMOLITION WORKER)

(The erection, building, moving, servicing and dismantling of enclosures, scaffolding, barricades, protection and site safety structures etc., on Interior Demolition jobs.)

Mason Tender Tier A

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$34.07

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Supplemental Benefit Rate per Hour: \$19.77

Mason Tender Tier B

On Interior Demolition job sites 33 1/3 % of the employees shall be classified as Tier A Interior Demolition Workers and 66 2/3 % shall be classified as Tier B Interior Demolition Workers; provided that the employer may employ more than 33 1/3 % Tier A Interior Demolition Workers on the job site. Where the number of employees on a job site is not divisible by 3, the first additional employee (above the number of employees divisible by three) shall be a Tier B Interior Demolition Worker, and the second additional employee shall be a Tier A Interior Demolition Worker.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.27

Supplemental Benefit Rate per Hour: \$14.08

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$41.43

Supplemental Benefit Rate per Hour: \$40.15

Supplemental Note: Supplemental benefits for overtime are paid at the appropriate overtime rate.

Overtime Description

Overtime would be time and one half the regular rate after a seven (7) or eight (8) hours workday, which would be set at the start of the job.

Overtime

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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
Columbus Day
Presidential Election 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

There shall be either two (2) or three (3) shifts, each shift shall be eight (8) hours with nine (9) hours pay, including one half (1/2) hour for lunch. Off-Hour Start shall commence after 3:30 P.M. and shall conclude by 6:00 A.M. The first consecutive seven (7) hours shall be at straight time with a differential of twelve dollars (\$12.00) per hour. Fringes shall be paid at the straight time rate.

(Local #46)

MILLWRIGHT

Millwright

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$47.69

Supplemental Benefit Rate per Hour: \$48.87

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

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Labor Day
Columbus Day
Presidential Election 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

The first shift shall receive the straight time rate of pay. The second shift receives the straight time rate of pay plus fifteen (15%) per cent. Members of the second shift shall be allowed one half hour to eat, with this time being included in the hours of the workday established. There must be a first shift to work a second shift. All additional hours worked shall be paid at the time and one-half rate of pay plus fifteen (15%) per cent for weekday hours.

(Local #740)

MOSAIC MECHANIC

Mosaic Mechanic - Mosaic & Terrazzo Mechanic

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$44.39**

Supplemental Benefit Rate per Hour: **\$35.11**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.08 per hour.

Mosaic Mechanic - Mosaic & Terrazzo Finisher

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$42.78**

Supplemental Benefit Rate per Hour: **\$35.11**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.08 per hour.

Mosaic Mechanic - Machine Operator Grinder

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$42.78**

Supplemental Benefit Rate per Hour: **\$35.11**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.08 per hour.

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

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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: 7/1/2013 - 4/30/2014

Wage Rate per Hour: **\$37.50**

Supplemental Benefit Rate per Hour: **\$25.62**

Supplemental Note: \$30.25 on overtime

Effective Period: 5/1/2014 - 6/30/2014

Wage Rate per Hour: **\$39.50**

Supplemental Benefit Rate per Hour: **\$26.12**

Supplemental Note: \$30.75 on overtime

Spray & Scaffold / Decorative / Sandblast

Effective Period: 7/1/2013 - 4/30/2014

Wage Rate per Hour: **\$40.50**

Supplemental Benefit Rate per Hour: **\$25.62**

Supplemental Note: \$30.25 on overtime

Effective Period: 5/1/2014 - 6/30/2014

Wage Rate per Hour: **\$42.50**

Supplemental Benefit Rate per Hour: **\$26.12**

Supplemental Note: \$30.75 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

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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 - SIGN

Designer

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$36.15**

Supplemental Benefit Rate per Hour: **\$9.66**

Journey person

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$33.62**

Supplemental Benefit Rate per Hour: **\$9.66**

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.

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

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All work performed outside the regular 8 hour work day (either 7:00 A.M to 3:30 P.M or 8:00 A.M. to 4:30 P.M) shall be paid at time and one half the regular hourly rate.

(Local #8A-28A)

PAINTER - STRIPER

Striper (paint)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$33.00**

Supplemental Benefit Rate per Hour: **\$11.62**

Supplemental Note: Overtime Supplemental Benefit rate - \$7.42; New Hire Rate (0-3 months) - \$0.00

Lineperson (thermoplastic)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$37.00**

Supplemental Benefit Rate per Hour: **\$11.62**

Supplemental Note: Overtime Supplemental Benefit rate - \$7.42; New Hire Rate (0-3 months) - \$0.00

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.

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

Day after Thanksgiving

Christmas Day

Shift Rates

Employees hired before April 1, 2003: 15% night shift premium differential for work commenced at 9:00 PM or later.

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

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receive five weeks vacation. Vacation must be taken during winter months. 2 Personal Days except employees hired after 4/1/12 who do not have 2 years of service.

(Local #917)

PAINTER - STRUCTURAL STEEL

Painters on Structural Steel

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$47.00**

Supplemental Benefit Rate per Hour: **\$32.08**

Painter - Power Tool

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$53.00**

Supplemental Benefit Rate per Hour: **\$32.08**

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

Regular hourly rates plus a ten per cent (10%) differential

(Local #806)

PAPERHANGER

Paperhanger

Effective Period: 7/1/2013 - 4/30/2014

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Wage Rate per Hour: **\$39.00**

Supplemental Benefit Rate per Hour: **\$29.23**

Supplemental Note: Supplemental benefits are to be paid at the appropriate straight time and overtime rate.

Effective Period: 5/1/2014 - 6/30/2014

Wage Rate per Hour: **\$41.08**

Supplemental Benefit Rate per Hour: **\$29.23**

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$43.54**

Supplemental Benefit Rate per Hour: **\$33.55**

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 before the installation of rubberized materials and similar surfaces; installation

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and repair of temporary construction fencing; slurry seal coating, maintenance of safety surfaces; play equipment installation, and other related work.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$39.67**

Supplemental Benefit Rate per Hour: **\$33.55**

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$45.12**

Supplemental Benefit Rate per Hour: **\$33.55**

Production Paver & Roadbuilder - Raker

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$44.61**

Supplemental Benefit Rate per Hour: **\$33.55**

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$41.32**

Supplemental Benefit Rate per Hour: **\$33.55**

Overtime Description

Veteran's Day is a Paid Holiday for employees working on production paving.

If an employee works New Year's Day or Christmas Day, they receive the single time rate plus 25%.

Employees who work on a holiday listed below receive the straight time rate plus one day's pay 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.

Paid Holidays

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

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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 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 20% over the single time rate for the screed person, rakers and shovelers directly involved only. All other workers will be exempt. Hours worked over eight (8) hours during said shift shall be paid for at the time and one-half rate.

(Local #1010)

PLASTERER

Plasterer

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$41.13

Supplemental Benefit Rate per Hour: \$24.95

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.

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

Martin Luther King Jr. 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

When it is not possible to conduct alteration work during regular work hours, in a building occupied by tenants, said work shall proceed on a shift basis: however work over seven (7) hours in any twenty four (24) hour period, the time after seven (7) hours shall be considered overtime.

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The second shift shall start at a time between 3:30 p.m. and 7:00 p.m. and shall consist of seven (7) working hours and shall receive eight (8) hours of wages and benefits at the straight time rate. The workers on the second shift shall be allowed one-half (½) hour to eat with this time being included in the seven (7) hours of work.

(Local #530)

PLASTERER - TENDER

Plasterer - Tender

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.00

Supplemental Benefit Rate per Hour: \$25.74

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

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Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$51.76

Supplemental Benefit Rate per Hour: \$37.19

Supplemental Note: Overtime supplemental benefit rate per hour: \$74.10

Overtime Description

Double time the regular rate after a 7 hour day - unless for new construction site work where the plumbing contract price is \$1.5 million or less, the hours of labor can be 8 hours per day at the employers option. On Alteration jobs when other mechanical trades at the site are working an eighth hour at straight time, then the plumber shall also work an eighth hour at straight time.

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

Shift Rates

Shift work, when directly specified in public agency or authority documents where plumbing contract is \$8 million or less, will be permitted. 30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday. 50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

PLUMBER (MECHANICAL EQUIPMENT AND SERVICE)

(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$33.46

Supplemental Benefit Rate per Hour: \$16.93

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

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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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$37.11

Supplemental Benefit Rate per Hour: \$25.56

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.

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(Plumbers Local #1)

**PLUMBER: PUMP & TANK
(Installation and Maintenance)**

Plumber - Pump & Tank

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$53.01**

Supplemental Benefit Rate per Hour: **\$31.86**

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 MECHANIC (EXTERIOR BUILDING
RENOVATION)**

Pointer - Waterproofer, Caulker Mechanic

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Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$45.41**

Supplemental Benefit Rate per Hour: **\$23.29**

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 4:30 P.M.) is to be paid at time and one half the regular rate.

(Bricklayer District Council)

ROOFER

Roofer

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$39.00**

Supplemental Benefit Rate per Hour: **\$27.37**

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

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Independence Day
Labor Day
Presidential Election 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.

(Local #8)

**SANDBLASTER - STEAMBLASTER
(Exterior Building Renovation)**

Sandblaster / Steamblaster

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$45.41**

Supplemental Benefit Rate per Hour: **\$23.29**

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 4:30 P.M.) is to be paid at time and one half the regular rate.

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(Bricklayer District Council)

SHEET METAL WORKER

Sheet Metal Worker

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$45.96**

Supplemental Benefit Rate per Hour: **\$43.19**

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Sheet Metal Worker - Duct Cleaner

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$12.90**

Supplemental Benefit Rate per Hour: **\$8.07**

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$36.77**

Supplemental Benefit Rate per Hour: **\$43.19**

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

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

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Shift Rates

Work that can only be performed outside regular working hours (seven 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. No journey person engaged in fan maintenance shall work in excess of forty (40) hours in any work week.

(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: 7/1/2013 - 7/31/2013

Wage Rate per Hour: \$41.28

Supplemental Benefit Rate per Hour: \$22.88

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Effective Period: 8/1/2013 - 6/30/2014

Wage Rate per Hour: \$40.78

Supplemental Benefit Rate per Hour: \$23.38

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

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Paid Holidays

None

(Local #28)

SIGN ERECTOR
(Sheet Metal, Plastic, Electric, and Neon)

Sign Erector

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$42.80**

Supplemental Benefit Rate per Hour: **\$42.17**

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

Washington's Birthday

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 I

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$52.50**

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Supplemental Benefit Rate per Hour: **\$50.54**
Supplemental Note: Overtime supplemental benefit rate: \$100.34

Overtime

Double time the regular rate after a 7 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

Work performed between 3:30 P.M. and 7:00 A.M. and on Saturdays, Sundays and Holidays shall be at double time the regular hourly rate and paid at the overtime supplemental benefit rate above.

Steamfitter II

For heating, ventilation, air conditioning and mechanical public works contracts with a dollar value not to exceed \$15,000,000 and for fire protection/sprinkler public works contracts not to exceed \$1,500,000.

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$52.50**
Supplemental Benefit Rate per Hour: **\$50.54**
Supplemental Note: Overtime supplemental benefit rate: \$100.34

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

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. A shift shall consist of eight working hours. All work performed in excess of eight hours shall be paid at double time. No shift shall commence after 7:00 P.M. on Friday or 7:00 P.M. the day before holidays. All work performed after 12:01 A.M. Saturday or 12:01 A.M. the day before a Holiday will be paid at double time. When shift work is performed the wage rate for regular time worked is a thirty percent premium together with fringe benefits.

On Transit Authority projects, where work is performed in the vicinity of tracks all shift work on weekends and holidays may be performed at the regular shift rates.

Local #638

**STEAMFITTER - REFRIGERATION AND AIR CONDITIONER
(Maintenance and Installation Service Person)**

Refrigeration and Air Conditioner Mechanic

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$36.30

Supplemental Benefit Rate per Hour: \$11.76

Refrigeration and Air Conditioner Service Person V

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$29.82

Supplemental Benefit Rate per Hour: \$10.71

Refrigeration and Air Conditioner Service Person IV

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$24.71

Supplemental Benefit Rate per Hour: \$9.80

Refrigeration and Air Conditioner Service Person III

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$21.21

Supplemental Benefit Rate per Hour: \$9.12

Refrigeration and Air Conditioner Service Person II

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$17.60

Supplemental Benefit Rate per Hour: \$8.50

Refrigeration and Air Conditioner Service Person I

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$10.95

Supplemental Benefit Rate per Hour: \$7.90

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

(Local #638B)

STONE MASON - SETTER

Stone Mason - Setters

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$47.72

Supplemental Benefit Rate per Hour: \$35.28

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: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$44.32

Supplemental Benefit Rate per Hour: \$21.66

Effective Period: 1/1/2014 - 6/24/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$44.82**
Supplemental Benefit Rate per Hour: **\$21.66**

Effective Period: 6/25/2014 - 6/30/2014
Wage Rate per Hour: **\$45.32**
Supplemental Benefit Rate per Hour: **\$21.66**

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.

Shift Rates

Time and one half the regular rate outside the regular work hours (8:00 A.M. through 3:30 P.M.)

(Local #1974)

**TELECOMMUNICATION WORKER
(Voice Installation Only)**

Telecommunication Worker

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: **\$35.94**
Supplemental Benefit Rate per Hour: **\$13.19**
Supplemental Note: The above rate applies for Manhattan, Bronx, Brooklyn, Queens. \$12.64 for Staten Island only.

Overtime

Time and one half the regular rate after a 7 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day
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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.49

Supplemental Benefit Rate per Hour: \$27.40

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$48.35**

Supplemental Benefit Rate per Hour: **\$31.44**

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$42.63

Supplemental Benefit Rate per Hour: \$44.54

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.

Time and one half the regular hourly rate after 40 hours in any work week.

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 but will be paid 113% of the straight time hourly wage and the straight time supplemental benefits.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

(Local #1536)

TUNNEL WORKER

Blasters, Mucking Machine Operators (Compressed Air Rates)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$54.20**

Supplemental Benefit Rate per Hour: **\$48.20**

Tunnel Workers (Compressed Air Rates)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$52.31**

Supplemental Benefit Rate per Hour: **\$46.59**

Top Nipper (Compressed Air Rates)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$51.35**

Supplemental Benefit Rate per Hour: **\$45.78**

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

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$50.42**

Supplemental Benefit Rate per Hour: **\$44.91**

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

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$50.42**

Supplemental Benefit Rate per Hour: **\$44.92**

Changehouse Attendant: Powder Watchperson (Compressed Air Rates)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$43.94**

Supplemental Benefit Rate per Hour: **\$42.55**

Blasters (Free Air Rates)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$51.72**

Supplemental Benefit Rate per Hour: **\$46.03**

Tunnel Workers (Free Air Rates)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$49.48
Supplemental Benefit Rate per Hour: \$44.06

All Others (Free Air Rates)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$45.73
Supplemental Benefit Rate per Hour: \$40.75

Microtunneling (Free Air Rates)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$39.58
Supplemental Benefit Rate per Hour: \$35.25

Overtime Description

For Repair-Maintenance Work on Existing Equipment and Facilities - Time and one half the regular rate after a 7 hour day, or for Saturday, or for Sunday. Double time the regular rate for work on a holiday.
For Small-Bore Micro Tunneling Machines - Time and one-half the regular rate shall be paid for all overtime.

Overtime

Double time the regular rate after an 8 hour day.
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.
Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Veteran's Day
Thanksgiving Day
Christmas Day

(Local #147)

WELDER

**TO BE PAID AT THE RATE OF THE JOURNEYPERSON IN THE TRADE
PERFORMING THE WORK.**

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OFFICE OF THE COMPTROLLER

CITY OF NEW YORK

220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

APPENDIX

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 employed on a public work project.

Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the journey person wage rate for the classification of work he 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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ASBESTOS HANDLER

(Ratio of Apprentice Journeyman: 1 to 1, 1 to 3)

Asbestos Handler (First 1000 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 78% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$15.05

Asbestos Handler (Second 1000 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$15.05

Asbestos Handler (Third 1000 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 83% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$15.05

Asbestos Handler (Fourth 1000 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 89% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$15.05

(Local #78)

BOILERMAKER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Boilermaker (First Year)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$28.75

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$29.74

Boilermaker (Second Year: 1st Six Months)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$30.33

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$31.91

Boilermaker (Second Year: 2nd Six Months)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$31.91

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$33.05

Boilermaker (Third Year: 1st Six Months)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$33.49

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$34.69

Boilermaker (Third Year: 2nd Six Months)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$35.05

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$36.34

Boilermaker (Fourth Year: 1st Six Months)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$36.63

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$38.00

Boilermaker (Fourth Year: 2nd Six Months)

Effective Period: 7/1/2013 - 12/31/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$38.20

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$39.65

(Local #5)

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

Bricklayer (First 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Second 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Third 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Fourth 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Fifth 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Sixth 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 95% of Journeyperson's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate Per Hour: \$16.60

(Bricklayer District Council)

CARPENTER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Carpenter (First Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 40% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$27.69

Effective 7/18/13 - Supplemental Benefit Rate Per Hour: \$30.29

Carpenter (Second Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$27.69

Effective 7/18/13 - Supplemental Benefit Rate Per Hour: \$30.29

Carpenter (Third Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 65% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$27.69

Effective 7/18/13 - Supplemental Benefit Rate Per Hour: \$30.29

Carpenter (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 80% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$27.69

Effective 7/18/13 - Supplemental Benefit Rate Per Hour: \$30.29

(Carpenters District Council)

CEMENT MASON

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Cement Mason (First Year)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 50% of Journeyman's Rate

Cement Mason (Second Year)

Effective Period: 7/1/2013 - 6/30/2014

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

Cement Mason (Third Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 70% of Journeyman's Rate

(Local #780)

CEMENT AND CONCRETE WORKER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Cement & Concrete Worker (0 - 500 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$18.04

Cement & Concrete Worker (501 - 1000 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 65% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$18.87

Cement & Concrete Worker (1001 - 2000 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 65% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$24.25

Cement & Concrete Worker (2001 - 4000 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 80% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$25.07

(Cement Concrete Workers District Council)

DERRICKPERSON & RIGGER (STONE)
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Derrickperson & Rigger (stone) - First Year

Effective Period: 7/1/2013 - 6/30/2014
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: 7/1/2013 - 6/30/2014
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: 7/1/2013 - 6/30/2014
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: 7/1/2013 - 6/30/2014
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: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$30.29

Dockbuilder/Pile Driver (Second Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyperson's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate Per Hour: \$30.29

Dockbuilder/Pile Driver (Third Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$30.29

Dockbuilder/Pile Driver (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$30.29

(Carpenters District Council)

ELECTRICIAN

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

Electrician (First Year - Hired before 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014

Wage Rate per Hour: \$15.25

Supplemental Benefit Rate per Hour: \$12.26

Overtime Wage Rate Per Hour: \$22.88

Overtime Supplemental Rate Per Hour: \$13.26

Effective Period: 5/14/2014 - 6/30/2014

Wage Rate per Hour: \$15.25

Supplemental Benefit Rate per Hour: \$12.51

Overtime Wage Rate Per Hour: \$22.88

Overtime Supplemental Rate Per Hour: \$13.51

Electrician (First Year - Hired on or After 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014

Wage Rate per Hour: \$12.50

Supplemental Benefit Rate per Hour: \$10.86

Overtime Wage Rate Per Hour: \$18.75

Overtime Supplemental Rate Per Hour: \$11.68

Effective Period: 5/14/2014 - 6/30/2014

Wage Rate per Hour: \$12.50

Supplemental Benefit Rate per Hour: \$11.11

Overtime Wage Rate Per Hour: \$18.75

Overtime Supplemental Rate Per Hour: \$11.93

Electrician (Second Year - Hired before 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$18.05**
Supplemental Benefit Rate per Hour: **\$13.68**
Overtime Wage Rate Per Hour: **\$27.08**
Overtime Supplemental Rate Per Hour: **\$14.87**

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$18.05**
Supplemental Benefit Rate per Hour: **\$13.93**
Overtime Wage Rate Per Hour: **\$27.08**
Overtime Supplemental Rate Per Hour: **\$15.12**

Electrician (Second Year - Hired on or After 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$14.50**
Supplemental Benefit Rate per Hour: **\$11.88**
Overtime Wage Rate Per Hour: **\$21.75**
Overtime Supplemental Rate Per Hour: **\$12.83**

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$14.50**
Supplemental Benefit Rate per Hour: **\$12.13**
Overtime Wage Rate Per Hour: **\$21.75**
Overtime Supplemental Rate Per Hour: **\$13.08**

Electrician (Third Year - Hired before 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$20.15**
Supplemental Benefit Rate per Hour: **\$14.75**
Overtime Wage Rate Per Hour: **\$30.23**
Overtime Supplemental Rate Per Hour: **\$16.08**

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$20.15**
Supplemental Benefit Rate per Hour: **\$15.00**
Overtime Wage Rate Per Hour: **\$30.23**
Overtime Supplemental Rate Per Hour: **\$16.33**

Electrician (Third Year - Hired on or After 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$16.50**
Supplemental Benefit Rate per Hour: **\$12.89**
Overtime Wage Rate Per Hour: **\$24.75**
Overtime Supplemental Rate Per Hour: **\$13.98**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$16.50**
Supplemental Benefit Rate per Hour: **\$13.14**
Overtime Wage Rate Per Hour: **\$24.75**
Overtime Supplemental Rate Per Hour: **\$14.23**

Electrician (Fourth Year - Hired before 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$22.10**
Supplemental Benefit Rate per Hour: **\$15.74**
Overtime Wage Rate Per Hour: **\$33.15**
Overtime Supplemental Rate Per Hour: **\$17.20**

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$22.10**
Supplemental Benefit Rate per Hour: **\$15.99**
Overtime Wage Rate Per Hour: **\$33.15**
Overtime Supplemental Rate Per Hour: **\$17.45**

Electrician (Fourth Year - Hired on or After 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$18.50**
Supplemental Benefit Rate per Hour: **\$13.91**
Overtime Wage Rate Per Hour: **\$27.75**
Overtime Supplemental Rate Per Hour: **\$15.13**

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$18.50**
Supplemental Benefit Rate per Hour: **\$14.16**
Overtime Wage Rate Per Hour: **\$27.75**
Overtime Supplemental Rate Per Hour: **\$15.38**

Electrician (Fifth Year - Hired before 5/10/07)

Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: **\$25.80**
Supplemental Benefit Rate per Hour: **\$19.21**
Overtime Wage Rate Per Hour: **\$38.70**
Overtime Supplemental Rate Per Hour: **\$20.83**

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: **\$26.30**
Supplemental Benefit Rate per Hour: **\$19.96**
Overtime Wage Rate Per Hour: **\$39.45**
Overtime Supplemental Rate Per Hour: **\$21.61**

Electrician (Fifth Year - Hired on or After 5/10/07)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Effective Period: 7/1/2013 - 5/13/2014
Wage Rate per Hour: \$22.00
Supplemental Benefit Rate per Hour: \$17.30
Overtime Wage Rate Per Hour: \$33.00
Overtime Supplemental Rate Per Hour: \$18.68

Effective Period: 5/14/2014 - 6/30/2014
Wage Rate per Hour: \$22.50
Supplemental Benefit Rate per Hour: \$18.05
Overtime Wage Rate Per Hour: \$33.75
Overtime Supplemental Rate Per Hour: \$19.46

Overtime Description

For "A" rated Apprentices (work in excess of 7 hours per day)
For "M" rated Apprentices (work in excess of 8 hours per day)

(Local #3)

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

Elevator (Constructor) - First Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$26.87

Elevator (Constructor) - Second Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$27.92

Elevator (Constructor) - Third Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Rate Per Hour: \$29.38

Elevator (Constructor) - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Rate Per Hour: \$30.84

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(Local #1)

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

Elevator Service/Modernization Mechanic (First Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Benefit Per Hour: \$26.79

Elevator Service/Modernization Mechanic (Second Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Benefit Per Hour: \$27.12

Elevator Service/Modernization Mechanic (Third Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Benefit Per Hour: \$28.43

Elevator Service/Modernization Mechanic (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Benefit Per Hour: \$29.74

(Local #1)

ENGINEER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 5)

Engineer - First Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$22.49
Supplemental Benefit Rate per Hour: \$20.68

Engineer - Second Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$28.11
Supplemental Benefit Rate per Hour: \$20.68

Engineer - Third Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$20.92
Supplemental Benefit Rate per Hour: \$20.68

Engineer - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$33.73
Supplemental Benefit Rate per Hour: \$20.68

(Local #15)

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

Operating Engineer - First Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour 40% of Journeyman's Rate
Supplemental Benefit Per Hour: \$18.60

Operating Engineer - Second Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyman's Rate
Supplemental Benefit Per Hour: \$18.60

Operating Engineer - Third Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyman's Rate
Supplemental Benefit Per Hour: \$18.60

(Local #14)

FLOOR COVERER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Floor Coverer (First Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 40% of Journeyman's rate
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Second Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Third Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Rate Per Hour: \$25.75

(Carpenters District Council)

GLAZIER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Glazier (First Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 40% of Journeyman's rate
Supplemental Rate Per Hour: \$11.97

Glazier (Second Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$21.13

Glazier (Third Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$23.54

Glazier (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Rate Per Hour: \$28.34

(Local #1281)

**HEAT & FROST INSULATOR
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)**

Heat & Frost Insulator (First Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

Heat & Frost Insulator (Second Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

Heat & Frost Insulator (Third Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 70% of Journeyman's rate

Heat & Frost Insulator (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 80% of Journeyman's rate

(Local #12)

**HOUSE WRECKER
(TOTAL DEMOLITION)**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

House Wrecker - First Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$20.36
Supplemental Benefit Rate per Hour: \$16.35

House Wrecker - Second Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$21.46
Supplemental Benefit Rate per Hour: \$16.35

House Wrecker - Third Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$23.01
Supplemental Benefit Rate per Hour: \$16.35

House Wrecker - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$25.36
Supplemental Benefit Rate per Hour: \$16.35

(Local #79)

IRON WORKER - ORNAMENTAL

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Iron Worker (Ornamental) - 1st Four Months - Hired on or Before 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$35.78

Iron Worker (Ornamental) 5 - 10 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Rate Per Hour: \$36.75

Iron Worker (Ornamental) 11 - 16 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: \$37.72

Iron Worker (Ornamental) 17 - 22 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: \$39.66

Iron Worker (Ornamental) 23 - 28 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Rate Per Hour: \$40.63

Iron Worker (Ornamental) 29 - 36 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Rate Per Hour: \$42.57

Iron Worker (Ornamental) - 1st Ten Months - Hired After 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: \$33.84

Iron Worker (Ornamental) - 11 - 16 Months - Hired After 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: \$34.81

Iron Worker (Ornamental) - 17 - 22 Months - Hired After 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: \$35.78

Iron Worker (Ornamental) - 23 - 28 Months - Hired After 8/1/08

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: \$37.72

Iron Worker (Ornamental) - 29 - 36 Months - Hired After 8/1/08

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Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Rate Per Hour: \$39.66

(Local #580)

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

Iron Worker (Structural) - 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$24.48
Supplemental Benefit Rate per Hour: \$43.87

Iron Worker (Structural) - 7- 18 Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$25.08
Supplemental Benefit Rate per Hour: \$43.87

Iron Worker (Structural) - 19 - 36 months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$25.68
Supplemental Benefit Rate per Hour: \$43.87

(Local #40 and #361)

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

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

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$33.25

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

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$33.25

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

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Rate Per Hour: \$33.25

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

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 90% of Journeyman's rate
Supplemental Rate Per Hour: \$33.25

(Local #731)

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

Cutters & Setters - First 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

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

Cutters & Setters - Second 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 55% of Journeyman's rate

Cutters & Setters - Third 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 65% of Journeyman's rate

Cutters & Setters - Fourth 750 Hours

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Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Cutters & Setters - Fifth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Cutters & Setters - Sixth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

Polishers & Finishers - First 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

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

Polishers & Finishers - Second 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

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

Polishers & Finishers - Third 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Polishers & Finishers - Fourth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

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: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$20.63

Supplemental Benefit Rate per Hour: \$17.06

Mason Tender - Second Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$21.73
Supplemental Benefit Rate per Hour: \$17.06

Mason Tender - Third Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$23.33
Supplemental Benefit Rate per Hour: \$17.06

Mason Tender - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$25.93
Supplemental Benefit Rate per Hour: \$17.06

(Local #79)

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

Metallic Lather (First Year -Called Prior to 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$28.11
Supplemental Benefit Rate per Hour: \$22.79

Metallic Lather (Second Year - Called Prior to 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$32.71
Supplemental Benefit Rate per Hour: \$24.44

Metallic Lather (Third Year - Called Prior to 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$37.77
Supplemental Benefit Rate per Hour: \$25.59

Metallic Lather (First Year -Called On Or After 6/29/11)

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Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$17.71
Supplemental Benefit Rate per Hour: \$19.85

Metallic Lather (Second Year - Called On Or After 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$22.81
Supplemental Benefit Rate per Hour: \$19.85

Metallic Lather (Third Year - Called On Or After 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$27.91
Supplemental Benefit Rate per Hour: \$19.85

(Local #46)

MILLWRIGHT

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

Millwright (First Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$26.23
Supplemental Benefit Rate per Hour: \$31.51

Millwright (Second Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$31.00
Supplemental Benefit Rate per Hour: \$34.77

Millwright (Third Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$35.77
Supplemental Benefit Rate per Hour: \$39.19

Millwright (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate per Hour: \$45.30

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Supplemental Benefit Rate per Hour: \$44.63

(Local #740)

PAVER AND ROADBUILDER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Paver and Roadbuilder - First Year (Minimum 1000 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$26.19

Supplemental Benefit Rate per Hour: \$16.20

Paver and Roadbuilder - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$27.77

Supplemental Benefit Rate per Hour: \$16.20

(Local #1010)

PAINTER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Painter - Brush & Roller - First Year

Effective Period: 7/1/2013 - 4/30/2014

Wage Rate per Hour: \$15.00

Supplemental Benefit Rate per Hour: \$11.38

Effective Period: 5/1/2014 - 6/30/2014

Wage Rate per Hour: \$15.80

Supplemental Benefit Rate per Hour: \$11.88

Painter - Brush & Roller - Second Year

Effective Period: 7/1/2013 - 4/30/2014

Wage Rate per Hour: \$18.75

Supplemental Benefit Rate per Hour: \$15.23

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Effective Period: 5/1/2014 - 6/30/2014
Wage Rate per Hour: **\$19.75**
Supplemental Benefit Rate per Hour: **\$15.73**

Painter - Brush & Roller - Third Year

Effective Period: 7/1/2013 - 4/30/2014
Wage Rate per Hour: **\$22.50**
Supplemental Benefit Rate per Hour: **\$18.14**

Effective Period: 5/1/2014 - 6/30/2014
Wage Rate per Hour: **\$23.70**
Supplemental Benefit Rate per Hour: **\$18.64**

Painter - Brush & Roller - Fourth Year

Effective Period: 7/1/2013 - 4/30/2014
Wage Rate per Hour: **\$30.00**
Supplemental Benefit Rate per Hour: **\$23.52**

Effective Period: 5/1/2014 - 6/30/2014
Wage Rate per Hour: **\$31.60**
Supplemental Benefit Rate per Hour: **\$24.02**

(District Council of Painters)

PAINTER - STRUCTURAL STEEL
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Painters - Structural Steel (First Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

Painters - Structural Steel (Second Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

Painters - Structural Steel (Third Year)

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 80% of Journeyman's rate

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(Local #806)

PLASTERER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Plasterer - First Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 40% of Journeyman's rate
Supplemental Rate Per Hour: \$12.76

Plasterer - First Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 45% of Journeyman's rate
Supplemental Rate Per Hour: \$13.24

Plasterer - Second Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$15.21

Plasterer - Second Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$16.29

Plasterer - Third Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 70% of Journeyman's rate
Supplemental Rate Per Hour: \$18.46

Plasterer - Third Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Rate Per Hour: \$19.54

(Local #530)

PLUMBER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Plumber - First Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$14.00

Supplemental Benefit Rate per Hour: \$0.71

Plumber - First Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$14.00

Supplemental Benefit Rate per Hour: \$2.96

Plumber - Second Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$17.96

Supplemental Benefit Rate per Hour: \$16.25

Plumber - Third Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$20.06

Supplemental Benefit Rate per Hour: \$16.25

Plumber - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$22.91

Supplemental Benefit Rate per Hour: \$16.25

Plumber - Fifth Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$24.31

Supplemental Benefit Rate per Hour: \$16.25

Plumber - Fifth Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$36.38

Supplemental Benefit Rate per Hour: \$16.25

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(Plumbers Local #1)

**POINTER - WATERPROOFER, CAULKER MECHANIC (EXTERIOR BUILDING
RENOVATION)**

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

Pointer - Waterproofer, Caulker Mechanic - First Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$25.00

Supplemental Benefit Rate per Hour: \$3.64

Pointer - Waterproofer, Caulker Mechanic - Second Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$27.25

Supplemental Benefit Rate per Hour: \$8.59

Pointer - Waterproofer, Caulker Mechanic - Third Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$32.23

Supplemental Benefit Rate per Hour: \$11.34

Pointer - Waterproofer, Caulker Mechanic - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.66

Supplemental Benefit Rate per Hour: \$11.34

(Bricklayer District Council)

ROOFER

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

Roofer - First Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 35% of Journeyperson's Rate

Roofer - Second Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's Rate

Roofer - Third Year

Effective Period: 7/1/2013 - 6/30/2014

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

Roofer - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's Rate

(Local #8)

SHEET METAL WORKER

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

Sheet Metal Worker - First Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 30% of Journeyperson's rate

Supplemental Rate Per Hour: \$15.37

Sheet Metal Worker - Second Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 35% of Journeyperson's rate

Supplemental Rate Per Hour: \$18.24

Sheet Metal Worker - Third Year (1st Six Months)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: \$20.06

Sheet Metal Worker - Third Year (2nd Six Months)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 45% of Journeyperson's rate

Supplemental Rate Per Hour: \$21.87

Sheet Metal Worker - Fourth Year (1st Six Months)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$23.69

Sheet Metal Worker - Fourth Year (2nd Six Months)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$25.33

Sheet Metal Worker - Fifth Year (1st Six Months)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$27.47

Sheet Metal Worker - Fifth Year (2nd Six Months)

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 70% of Journeyman's rate
Supplemental Rate Per Hour: \$31.23

(Local #28)

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

Sign Erector - First Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 35% of Journeyman's rate
Supplemental Rate Per Hour: \$5.96

Sign Erector - First Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 40% of Journeyman's rate
Supplemental Rate Per Hour: \$6.75

Sign Erector - Second Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 45% of Journeyman's rate
Supplemental Rate Per Hour: \$7.55

Sign Erector - Second Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$8.34

Sign Erector - Third Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$9.13

Sign Erector - Third Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$9.92

Sign Erector - Fourth Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Rate Per Hour: \$10.72

Sign Erector - Fourth Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 70% of Journeyman's rate
Supplemental Rate Per Hour: \$11.51

Sign Erector - Fifth Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Rate Per Hour: \$12.30

Sign Erector - Sixth Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Rate Per Hour: \$12.30

(Local #137)

STEAMFITTER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Steamfitter - First Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate and Supplemental Per Hour: 40% of Journeyperson's rate

Steamfitter - Second Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate and Supplemental Rate Per Hour: 50% of Journeyperson's rate.

Steamfitter - Third Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate and Supplemental Rate per Hour: 65% of Journeyperson's rate.

Steamfitter - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate and Supplemental Rate Per Hour: 80% of Journeyperson's rate.

Steamfitter - Fifth Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate and Supplemental Rate Per Hour: 85% of Journeyperson's rate.

(Local #638)

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

Stone Mason - Setters - First 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Second 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Third 750 Hours

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014
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: 7/1/2013 - 6/30/2014
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: 7/1/2013 - 6/30/2014
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: 7/1/2013 - 6/30/2014
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: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Drywall Taper - Second Year

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Drywall Taper - Third Year

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #1974)

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

Tile Layer - Setter - First 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

Tile Layer - Setter - Second 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 55% of Journeyman's rate

Tile Layer - Setter - Third 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 65% of Journeyman's rate

Tile Layer - Setter - Fourth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 75% of Journeyman's rate

Tile Layer - Setter - Fifth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 85% of Journeyman's rate

Tile Layer - Setter - Sixth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014
Wage and Supplemental Rate Per Hour: 95% of Journeyman's rate

(Local #7)

TIMBERPERSON
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 6)

Timberperson - First Year

Effective Period: 7/1/2013 - 6/30/2014
Wage Rate Per Hour: 40% of Journeyman's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Rate Per Hour: \$30.04

Timberperson - Second Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$30.04

Timberperson - Third Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Rate Per Hour: \$30.04

Timberperson - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$30.04

(Local #1536)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

LABOR LAW § 230 AND NYC ADMINISTRATIVE CODE § 6-130
BUILDING SERVICE EMPLOYEES

PREVAILING WAGE FOR BUILDING SERVICE EMPLOYEES ON NYC CONTRACTS PURSUANT TO
LABOR LAW § 230 ET SEQ.

Building service employees on public contracts must receive not less than the prevailing rate of wage and supplements for the classification of work performed. In accordance with Labor Law §230 et seq. the Comptroller of the City of New York has promulgated this schedule of prevailing wages and supplemental benefits for building service employees engaged on New York City public building service contracts in excess of \$1,500.00. Prevailing rates are required to be annexed to and form part of the contract pursuant to §231 (4).

Contracting agencies that anticipate doing work that may require building service trades or classifications not included in this schedule may request the Comptroller to establish a proper classification and wage determination for the work. Contractors using trades and/or classifications for which the Comptroller has not promulgated wages and benefits do so at their own risk.

Contractors are advised to review the applicable Comptroller's Prevailing Wage Schedule before bidding on public work. Any Prevailing Wage Rate error made by the Contracting Agency, whether in a contract document or other communication, will not preclude a finding against the contractor of a prevailing-wage violation.

PREVAILING WAGE FOR BUILDING SERVICE EMPLOYEES IN NEW YORK CITY LEASED OR
FINANCIALLY ASSISTED FACILITIES PURSUANT TO NYC ADMINISTRATIVE CODE § 6-130

Covered landlords & covered financial assistance recipients shall ensure that all building service employees performing building service work at the premises to which a lease or financial assistance pertains are paid no less than the prevailing wage listed in the Labor Law §230 Prevailing Wage Schedule.

Covered Landlords include:

Businesses (other than not-for-profit organizations) leasing to New York City agencies commercial office space or commercial office facilities of 10,000 square feet or more where the City leases or rents no less than 51% of the total square footage of the building to which the lease applies (no less than 80% in Staten Island or in an area not defined as an exclusion area pursuant to section 421-a of the real property tax law on the date of enactment of the local law).

Covered Financial Assistance Recipients include:

Businesses (other than not-for-profit organizations) with annual gross revenues of five million dollars or more who have received financial assistance from the City of New York (as defined in New York City Administrative Code §6-130) with a total value of one million dollars or more.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Exemptions: Business Improvement Districts and employers with manufacturing operations at the premises to which the financial assistance pertains.

The information is intended to assist you in meeting your prevailing wage obligation. You should consult New York City Administrative Code §6-130 to determine whether you are covered by this prevailing wage law. New York City Administrative Code § 6-130 requires the City to maintain an updated list of covered landlords and financial assistance recipients who are subject to the prevailing wage requirement.

Labor Law § 231 (6) and NYC Administrative Law §6-130 require contractors to post on the site of the work a current copy of this schedule of wages and supplements.

This schedule is applicable to work performed during the effective period, unless otherwise noted. Changes to this schedule are published on our web site www.comptroller.nyc.gov. Contractors must pay the wages and supplements in effect when the building service employee 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 www.comptroller.nyc.gov.

Contractors are solely responsible for maintaining original payroll records delineating, among other things, the hours worked by each employee within a given classification.

Some of the rates in this schedule are based on collective bargaining agreements. The Comptroller's Office has attempted to include all overtime, shift and night differential, Holiday, Saturday, Sunday or other premium time work. However, this schedule does not set forth every prevailing practice with respect to such rates with which employers must comply. All such practices are nevertheless part of the employer's prevailing wage obligation and contained in the collective bargaining agreements of the prevailing wage unions. These collective bargaining agreements are available for inspection by appointment. Requests for appointments may be made by calling (212) 669-4443, Monday through Friday between the hours of 9 a.m. and 5 p.m.

Answers to questions concerning prevailing trade practices may be obtained from the Classification Unit by calling (212) 669-7974. Please direct all other compliance issues to: Bureau of Labor Law, Attn: Wasyl Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 1122, New York, N.Y. 10007; Fax (212) 669-4002.

In order to meet their obligation to provide prevailing supplemental benefits to each covered employee, employers must either:

- 1) Provide bona-fide 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 benefits and wage supplements which cost the employer no less than the prevailing supplemental benefits rate in total.

Benefits are paid for **EACH HOUR WORKED** unless otherwise noted.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE



Office of the Comptroller
BUREAU OF LABOR LAW

CITY OF NEW YORK
OFFICE OF THE COMPTROLLER
JOHN C. LIU

BUREAU OF LABOR LAW

MUNICIPAL BUILDING
ONE CENTRE STREET, ROOM 1120
NEW YORK, N.Y. 10007-2341

TEL: (212) 669-4443
FAX: (212) 669-4002

If you are a Covered Building Service Employee and you have been paid less than the Prevailing Wage and Benefits, please contact us at 212-669-4443 or download our complaint form from our website at WWW.COMPTROLLER.NYC.GOV (click on the Bureau of Labor Law).

Si es un empleado de servicios a edificios elegible y recibió menos del sueldo prevalente y beneficios, por favor contáctenos en 212-669-4443 o descarga un formulario de reclamo del sitio del Internet WWW.COMPTROLLER.NYC.GOV (opreme "Oficina de Derecho Laboral").

Wasył Kinach, P.E.
Director of Classifications
Bureau of Labor Law

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BOILER SERVICE PERSON/TANK CLEANER MECHANIC (LOW PRESSURE)

Boiler Service Person/Tank Cleaner Mechanic (Low Pressure)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$11.37

Supplemental Benefit Rate per Hour: \$5.57

Overtime Description

Work in excess of 8 hours performed on a Sunday or Holiday shall be paid two and one half times the regular rate.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

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

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Employee's Birthday

Vacation

1 year service.....five (5) days

3 years service or more.....ten (10) days

8 years service or more.....fifteen (15) days

13 years service or more.....twenty (20) days

SICK LEAVE:

1-2 years employment.....4 days

2-3 years employment.....5 days

3-4 years employment.....6 days

4-5 years employment.....8 days

6 years or more employment.....10 days

(Local #32 BJJ)

BUILDING CLEANER AND MAINTAINER (OFFICE)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Office Building Class "A" Handyperson (Over 280,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$25.10**

Supplemental Benefit Rate per Hour: **\$9.51**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$25.55**

Supplemental Benefit Rate per Hour: **\$9.91**

Office Building Class "A" Foreperson, Starter (Over 280,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$24.99**

Supplemental Benefit Rate per Hour: **\$9.51**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$25.44**

Supplemental Benefit Rate per Hour: **\$9.91**

Office Building Class "A" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 280,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$22.97**

Supplemental Benefit Rate per Hour: **\$9.51**

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$23.42**

Supplemental Benefit Rate per Hour: **\$9.91**

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Office Building Class "B" Handyperson (Over 120,000 and less than 280,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$25.07

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$25.52

Supplemental Benefit Rate per Hour: \$9.91

Office Building Class "B" Foreperson, Starter (Over 120,000 and less than 280,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$24.95

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$25.40

Supplemental Benefit Rate per Hour: \$9.91

Office Building Class "B" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 120,000 and less than 280,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$22.94

Supplemental Benefit Rate per Hour: \$9.51

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$23.39

Supplemental Benefit Rate per Hour: \$9.91

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Office Building Class "C" Handyperson (Less than 120,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$25.02

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$25.47

Supplemental Benefit Rate per Hour: \$9.91

Office Building Class "C" Foreperson, Starter (Less than 120,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$24.91

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$25.36

Supplemental Benefit Rate per Hour: \$9.91

Office Building Class "C" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Less than 120,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$22.90

Supplemental Benefit Rate per Hour: \$9.51

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment; and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$23.35

Supplemental Benefit Rate per Hour: \$9.91

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for work on a holiday plus the day's pay.
Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Vacation

Less than 6 months of work.....no vacation
6 months of work.....three (3) days
1 year of work.....ten (10) days
5 years of work.....fifteen (15) days
15 years of work.....twenty (20) days
21 years of work.....twenty-one (21) days
22 years of work.....twenty-two (22) days
23 years of work.....twenty-three (23) days
24 years of work.....twenty-four (24) days
25 years or more of work.....twenty-five (25) days
Plus two Personal Days per year.

Sick Leave:

10 sick days per year.
Unused sick leave paid in the succeeding January, one full day pay for each unused sick day.

(Local #32 B/J)

BUILDING CLEANER AND MAINTAINER (RESIDENTIAL)

Residential Building Class "A" Handyperson

Residential Buildings Class "A": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$4000.00 a room.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.57

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: Effective 1/1/2014 - \$9.83

Residential Building Class "A" Cleaner/Porter

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Residential Buildings Class "A": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$4000.00 a room.

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$21.34

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$21.34

Supplemental Benefit Rate per Hour: \$9.83

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Residential Building Class "B" Handyperson

Residential Building Class "B": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$2000.00 a room and not over \$4000.00 a room.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.51

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: Effective 1/1/2014 - \$9.83

Residential Building Class "B" Cleaner/Porter

Residential Building Class "B": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$2000.00 a room and not over \$4000.00 a room.

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$21.28

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$21.28

Supplemental Benefit Rate per Hour: \$9.83

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Residential Building Class "C" Handyperson

Residential Building Class "C": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of \$2000.00 or less a room.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.45

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: Effective 1/1/2014 - \$9.83

Residential Building Class "C" Cleaner/Porter

Residential Building Class "C": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of \$2000.00 or less a room.

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$21.23

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$21.23

Supplemental Benefit Rate per Hour: \$9.83

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for work on a holiday plus the day's pay.

Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

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

Vacation

6 months.....three (3) days
1 year.....ten (10) days
5 years.....fifteen (15) days
15 years.....twenty (20) days
21 years.....twenty-one (21) days
22 years.....twenty-two (22) days
23 years.....twenty-three (23) days
24 years.....twenty-four (24) days
25 years.....twenty-five (25) days
Plus two Personal Days per year.

SICK LEAVE

After 1 year of service.....ten (10) days per year
(Local #32 B/J)

BUILDING HVAC SERVICES OPERATOR

Engineer (Refrigeration)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate per Hour: **\$35.18**
Supplemental Benefit Rate per Hour: **\$15.78**

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate per Hour: **\$36.73**
Supplemental Benefit Rate per Hour: **\$16.35**

Fireperson

Fireperson (Helper): Assist the Engineer

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate per Hour: **\$27.39**
Supplemental Benefit Rate per Hour: **\$15.41**

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate per Hour: **\$28.60**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$15.97

Overtime Description

All hours worked on a holiday shall be paid at two and one half times the regular wage rate in lieu of the paid day off.

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

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Plus six (6) floating Holidays

Vacation

6 months three (3) days

1 year ten (10) days

5 years fifteen (15) days

15 years twenty (20) days

21 years twenty-one (21) days

22 years twenty-two (22) days

23 years twenty-three (23) days

24 years twenty-four (24) days

25 years twenty-five (25) days

(Local #94)

CLEANER (PARKING GARAGE)

Garage Cleaner

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$11.20

Supplemental Benefit Rate per Hour: \$1.72

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

FUEL OIL

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (5th Year and above)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$30.61**

Supplemental Benefit Rate per Hour: **\$20.42**

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (4th Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$28.00**

Supplemental Benefit Rate per Hour: **\$20.42**

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (3rd Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$26.00**

Supplemental Benefit Rate per Hour: **\$20.42**

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (2nd Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$24.00**

Supplemental Benefit Rate per Hour: **\$20.42**

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (1st Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$22.00**

Supplemental Benefit Rate per Hour: **\$20.42**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for 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

Lincoln's Birthday

Washington's Birthday

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Veteran's Day

Triple time the regular rate for work on the following holiday(s).

- New Year's Day
- Thanksgiving Day
- Christmas Day

Paid Holidays

- New Year's Day
- Martin Luther King Jr. Day
- Lincoln's Birthday
- Washington's Birthday
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Election Day
- Veteran's Day
- Thanksgiving Day
- Christmas Day

Vacation

- Less than 75 days worked.....no vacation.
- 75 days worked, but less than 110 days worked in a calendar year.....five (5) days the following year.
- 110 days or more worked in a calendar year.....ten (10) days the following year.

SICK LEAVE:

1 day sick leave earned for each 40 days worked in the preceding calendar year for a maximum of five (5) days per calendar year.

(Local #553)

GARDENER

Gardener

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$17.16

Supplemental Benefit Rate per Hour: \$1.72

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$230 PREVAILING WAGE SCHEDULE

LOCKSMITH

Locksmith

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$19.63

Supplemental Benefit Rate per Hour: \$6.20

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

MEDICAL WASTE REMOVAL

Driver

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$18.00

Supplemental Benefit Rate per Hour: \$9.34

Helper

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$14.25

Supplemental Benefit Rate per Hour: \$9.34

Tractor Trailer Driver

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$20.50

Supplemental Benefit Rate per Hour: \$9.34

Overtime Description

Time and one half the regular hourly rate after an 8 hour day or after 40 hours in any work week. The seventh day of work in a workweek is paid at double time the regular hourly rate. Time and one half the regular hourly rate for work on a holiday plus days pay for below paid holidays.

Paid Holidays

President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Christmas Day

Vacation

1 year of service but less than five years.....	ten (10) days
5 years of service but less than ten years.....	fifteen (15) days
10 years of service.....	sixteen (16) days
11 years.....	seventeen (17) days
12 years.....	eighteen (18) days
13 years.....	nineteen (19) days
14 years.....	twenty (20) days
20 years.....	twenty-one (21) days
21 years.....	twenty-two (22) days
22 years.....	twenty-three (23) days
23 years.....	twenty-four (24) days
24 years.....	twenty-five (25) days

Plus 5 Personal Days

(Local #813)

MOVER - OFFICE FURNITURE AND EQUIPMENT

Heavy and Tractor Trailer Truck Driver

Tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$22.57**

Supplemental Benefit Rate per Hour: **\$4.49**

Light Truck Driver

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$19.81**

Supplemental Benefit Rate per Hour: **\$4.49**

Laborer and Freight, Stock, and Material Movers, Hand

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$17.51**

Supplemental Benefit Rate per Hour: **\$4.49**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

REFUSE REMOVER

Refuse Remover

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$29.27**

Supplemental Benefit Rate per Hour: **\$4.49**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

SECURITY GUARD (ARMED)

Security Guard (Armed)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$28.00**

Supplemental Benefit Rate per Hour: **\$4.90**

Supplemental Note: for new employee 0-30 days of employment - \$4.26; for new employee 31-120 days of employment - \$4.43; for new employee 121 days - 2 years of employment - \$4.54

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$28.25**

Supplemental Benefit Rate per Hour: **\$5.02**

Supplemental Note: for new employee 0-30 days of employment - \$4.44; for new employee 31-120 days of employment - \$4.61; for new employee 121 days - 2 years of employment - \$4.63

Months of employment shall be defined as an Employee's length of service with the Employer or at the Facility, whichever is greater.

Overtime Description

A guard who works a holiday is paid the regular rate plus receives the paid holiday.

Supplemental Benefits shall be paid for each hour paid, up to forty (40) paid hours per week.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day
Personal Day

Vacation

Months on payroll	Vacation with Pay
6	3 days
12	5 days
24	10 days
60	15 days
180	20 days
300	25 days

Sick Leave

Employees accrue paid sick leave at the rate of one (1) sick day for every six (6) months worked, up to a maximum of six (6) days a year.

(Local #32B/J)

SECURITY GUARD (UNARMED)

Security Guard (Unarmed) 0 - 6 months

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$12.85**

Supplemental Benefit Rate per Hour: **\$4.54**

Supplemental Note: for new employee 0-30 days of employment - \$4.26; for new employee 31-120 days of employment - \$4.43

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$13.10**

Supplemental Benefit Rate per Hour: **\$4.63**

Supplemental Note: for new employee 0-30 days of employment - \$4.44; for new employee 31-120 days of employment - \$4.61

Security Guard (Unarmed) 7 - 12 months

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$13.35**

Supplemental Benefit Rate per Hour: **\$4.54**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$13.60**

Supplemental Benefit Rate per Hour: **\$4.63**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Security Guard (Unarmed) 13 - 18 months

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$13.85**

Supplemental Benefit Rate per Hour: **\$4.54**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$14.10**

Supplemental Benefit Rate per Hour: **\$4.63**

Security Guard (Unarmed) 19 - 24 months

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$14.35**

Supplemental Benefit Rate per Hour: **\$4.54**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$14.60**

Supplemental Benefit Rate per Hour: **\$4.63**

Security Guard (Unarmed) 25 - 30 months

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$14.85**

Supplemental Benefit Rate per Hour: **\$4.90**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$15.10**

Supplemental Benefit Rate per Hour: **\$5.02**

Security Guard (Unarmed) 31 months or more

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$15.15**

Supplemental Benefit Rate per Hour: **\$4.90**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$15.60**

Supplemental Benefit Rate per Hour: **\$5.02**

Months of employment shall be defined as an Employee's length of service with the Employer or at the Facility, whichever is greater.

Overtime Description

A guard who works a holiday is paid the regular rate plus receives the paid holiday.
Supplemental Benefits shall be paid for each hour paid, up to forty (40) paid hours per week.

Overtime

Time and one half the regular rate after an 8 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day
Personal Day

Vacation

Months on payroll	Vacation with Pay
6	3 days
12	5 days
24	10 days
60	15 days
180	20 days
300	25 days

Sick Leave

Employees accrue paid sick leave at the rate of one (1) sick day for every six (6) months worked, up to a maximum of six (6) days a year.

(Local #32B/J)

WINDOW CLEANER

Window Cleaner

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$26.44**

Supplemental Benefit Rate per Hour: **\$9.51**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$26.90**

Supplemental Benefit Rate per Hour: **\$9.91**

Power Operated Scaffolds, Manual Scaffolds, and Boatswain Chairs

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$28.69**

Supplemental Benefit Rate per Hour: **\$9.51**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$29.27**

Supplemental Benefit Rate per Hour: **\$9.91**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Window Cleaner Apprentice (0 - 3 months)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate per Hour: **\$19.59**
Supplemental Benefit Rate per Hour: None

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate per Hour: **\$19.92**
Supplemental Benefit Rate per Hour: None

Window Cleaner Apprentice (4 - 7 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate per Hour: **\$21.18**
Supplemental Benefit Rate per Hour: **\$9.51**

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate per Hour: **\$21.54**
Supplemental Benefit Rate per Hour: **\$9.91**

Window Cleaner Apprentice (8 - 11 months)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate per Hour: **\$22.44**
Supplemental Benefit Rate per Hour: **\$9.51**

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate per Hour: **\$22.82**
Supplemental Benefit Rate per Hour: **\$9.91**

Window Cleaner Apprentice (12 - 15 months)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate per Hour: **\$23.72**
Supplemental Benefit Rate per Hour: **\$9.51**

Effective Period: 1/1/2014 - 6/30/2014
Wage Rate per Hour: **\$24.12**
Supplemental Benefit Rate per Hour: **\$9.91**

Window Cleaner Apprentice (16 - 17 months)

Effective Period: 7/1/2013 - 12/31/2013
Wage Rate per Hour: **\$25.01**
Supplemental Benefit Rate per Hour: **\$9.51**

Effective Period: 1/1/2014 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$25.44

Supplemental Benefit Rate per Hour: \$9.91

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

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Personal Day

Vacation

After 7 months but less than 1 year of service.....five (5) days

1 year but less than 5 years of service.....ten (10) days

5 years of service but less than 15 years of service.....fifteen (15) days

15 years of service but less than 21 years of service.....twenty (20) days

21 years.....twenty-one (21) days

22 years.....twenty-two (22) days

23 years.....twenty-three (23) days

24 years.....twenty-four (24) days

25 years or more of service.....twenty-five (25) days

Plus 1 day per year for medical visit

SICK LEAVE:

10 days after one year worked. Unused sick days to be paid in cash.

(Local #32 B/J)

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SECTION 01000

**GENERAL
CONDITIONS**

APPLICABLE TO ALL CONTRACTS

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The ADDENDUM TO THE GENERAL CONDITIONS is contained in Volume 3 of the Contract Documents. Volume 3 contains the following:

- Addendum to the General Conditions
- Specifications

SECTION 01000 GENERAL CONDITIONS

PART 1 - GENERAL

1.01 Applicability of General Conditions

- A. Since there are several separate Contracts pertaining to the construction of this project, for convenience, the General Conditions are stated only once. These General Conditions are applicable to all Contracts and shall constitute an integral part of each separate Contract to the same extent as though they were repeated in full therein.
- B. The Contractor is advised that various sections of these General Conditions are amended by the Addendum to the General Conditions. This Addendum also includes various schedules referred to in these General Conditions (Schedules A through F). These schedules contain important information that is specific to this project. The Addendum, including Schedules A through F, is set forth in Volume 3 of the Contract Documents.
- C. Throughout these General Conditions, various responsibilities and obligations are assigned to each of the following four Contractors: (1) General Construction, (2) Plumbing, (3) Heating/Ventilating/Air-Conditioning/Fire Protection, and (4) Electrical. In the event the Project does not involve all four Contracts, the responsibilities and obligations of each omitted Contract shall be assigned to one of the Contracts which is included in the Project. The Addendum to the General Conditions specifies which Contractor shall perform the responsibilities and obligations of each omitted contract, as set forth in the General Conditions.

1.02 Scope and Intent

- A. DESCRIPTION OF PROJECT - Refer to the Addendum to the General Conditions for a description of this project.
- B. PROGRESS SCHEDULE
 1. Within 15 days after the Notice to Proceed, the Contractor for General Construction Work shall prepare a composite Job Progress Chart that shall indicate graphically and chronologically the time the various parts of the work of all Contracts shall commence and be completed. The Chart shall be in a reproducible form approved by the Commissioner.
 2. Immediately after the Notice to Proceed of their Contracts, the Contractors for Plumbing Work, Heating, Ventilating and Air Conditioning Work (HVAC) and Electrical Work, as applicable, shall furnish all necessary data to the Contractor for General Construction Work, and cooperate in all respects in connection with formulation of the Chart.
 3. The Chart shall show the sequence and interrelationship of each operation of all the Contracts.
 4. The Chart shall show the estimated time for fabrication and/or delivery of all materials and equipment required for the work.
 5. As directed by the Resident Engineer, the Contractors shall meet with each other and with the Resident Engineer to review and make the necessary adjustments to the composite Job Progress Chart, and to coordinate the work indicated thereon. (Article 12 of the Contract).
 6. When completed, the Job Progress Chart shall be signed and dated by each Contractor or their official representative. The Resident Engineer is authorized to sign the Chart for the Department of Design and Construction. Thereafter, the Chart shall be modified only with the Commissioner's approval. When directed by the Commissioner, the Chart shall be revised and updated. If necessary, a new revised Chart shall be prepared in the same manner as outlined above for the original Chart.

7. The approved Chart shall be distributed by the Contractor for General Construction Work, as follows: the original and two (2) copies to the Resident Engineer, two (2) copies to each Contractor, and two (2) copies to the Department of Design and Construction
 8. All Contractors shall consult the approved Progress Chart and install their work within the time limits indicated on the Chart.
 9. The Resident Engineer shall post in a prominent place in the field office a copy of the Chart and mark thereon the progress of the work, including the times when various parts of the work commenced and were completed.
- C. **COMPLETION OF WORK** - Work to be done under each separate Contract comprises the furnishing of all labor, materials, equipment and other appurtenances and obtaining of all regulatory agency approvals necessary and required to complete the construction work in accordance with the Contract.
- D. **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 shall be performed by the Contractor as though it were originally delineated or described. Such work is deemed included in the Bid Price.
- E. **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 shall be performed by the Contractor. Such work is deemed included in the Bid Price.
- F. **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, shall 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 shall be made upon that basis.
- G. **CONFLICT BETWEEN CONTRACT DRAWINGS AND SPECIFICATIONS** - Should any conflict occur in or between the Drawings and Specifications, the Contractor shall be deemed to have estimated on the most expensive way of doing the work unless the Contractor shall have asked for and obtained a decision in writing from the Commissioner before the submission of the bid as to what shall govern.
- H. **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 therein, it is therefore expressly understood and agreed that the Contractor shall 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 arising as to possible or alleged interference between the various Contractors which may retard the progress of the work, the dispute shall be adjudicated by the Commissioner, whose decision as to the party or parties at fault and as to the manner in which the matter may be adjudicated, shall be binding and conclusive on all parties.
- I. **"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 shall, unless expressed otherwise, imply the direction, requirements, permission, order, designation or prescription of the Commissioner.
- J. **"APPROVED," ETC.** - "Approved," "acceptable," "satisfactory," and words of similar import shall mean and intend approved, acceptable or satisfactory to the Commissioner.
- K. **CONFLICTS OF INTERESTS** - The Charter of the City of New York, Section 2604, provides a number of safeguards in relation to conflicts of interest. Such safeguards include, without limitation, the following: "No public servant shall receive compensation except from the City for performing any official duty or accept or receive any gratuity from any person whose interest may be affected by the

public servant's official action."

1. Other sections of the City Charter, the Administrative Code and the Penal Law are applicable in implementing the basic Conflicts of Interest Section and under certain circumstances penalties may be invoked against the donor as well as the recipient of any form of valuable gift.
2. Notice is hereby given that sections of the City Charter, the Administrative Code and the Penal Law alluded to herein shall apply under the terms of this Contract to circumstances relevant to conflicts of interest and shall be extended in application to subcontractors authorized to perform work, labor and services pursuant to this Contract and further, it shall be the duty and responsibility of the Contractors to so inform their respective subcontractors.

1.03 Provisions Referenced in the Contract

- 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 to the General Conditions, sets forth 1) the referenced Articles of the Contract, and 2) the specific requirements applicable to each respective Contract.
- B. Applications for Extensions of Time, as indicated in Article 13 of the Contract, shall 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 insure the availability of materials, fixtures and equipment when needed for the work, the Commissioner may authorize partial payment for certain materials, fixtures and equipment, prior to their incorporation in the work, but only in strict accordance with, and subject to, all the terms and conditions set forth in the Specifications, unless an alternate method of payment is elsewhere provided in the Specifications for specified materials, fixtures or equipment.
 1. The Contractor shall 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 shall be accompanied by a schedule of the types and quantities of materials, and shall 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 shall 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 shall set apart and separately store at the place or places of storage all materials and shall clearly mark same "PROPERTY OF THE CITY OF NEW YORK", and further, shall 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 shall be stored at such locations as shall 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 shall 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 shall 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 shall be payable to the City of New York. It shall be in such terms and amounts as shall be approved by the Commissioner and shall be

placed with a company duly licensed to do business in the State of New York. The Contractor shall 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 shall 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 shall 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, shall 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 shall have and may exercise any and all other remedies at law for the recovery of such cost, charges and expenses. There shall be no increase in the Contract price for such costs, charges and expenses and the Contractor shall not make any claim or demand for compensation therefor.
6. The Contractor shall 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 shall 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, shall 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 and Specifications, the Contractor shall remove and replace, at Contractor's own cost, such defective or improperly incorporated material with materials complying with the Contract and Specifications. 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall 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 therefor from the Comptroller. Failure on the part of the Contractor to submit satisfactory evidence that all such materials have been paid for in full, shall preclude the Contractor from payments under the Contract.
14. The Contractor shall include in each succeeding partial estimate requisition a summary of materials stored which shall 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 shall 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. **EXCISE AND TRANSPORTATION TAXES**- Pursuant to Section 6 of the "Information for Bidders", the Contractor may be exempted from the payment of Federal Excise and Transportation Taxes in accord with the following:

1. Excise Tax Exemption Certificate will be certified by the Department of Design and Construction where requested by the Contractor, for items which fall within the scope of the Contract and which may be exempt from Federal Excise Tax.
2. **TRANSPORTATION TAX** - The 3% Federal Tax has been repealed and is hereby deleted from the Contract. The 10% Federal Tax for travel remains in effect.

E. **CORRESPONDENCE** - There shall be six (6) copies of all letters of correspondence to the Department of Design and Construction. An additional copy of all correspondence shall be sent directly to the Resident Engineer at the job site.

F. **MOBILIZATION PAYMENT** - A line item for mobilization shall be allowed on the Contractor's Detailed Estimate 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 shall be deemed included in the total Contract Price. The Detailed Estimate shall reflect, and the Mobilization Payment shall be made, in accordance with the following schedule:

Contract Amount		Percent	Mobilization
Less than	\$ 50,000 x	0 =	0
\$ 50,000 -	\$ 100,000	=	\$ 6,000
\$ 100,001 -	\$ 500,000 x	6 =	\$ 6,000 (min) - \$ 30,000 (max)

\$ 500,001 - \$ 2,500,000 x 5 = \$ 30,000 (min) - \$ 125,000 (max)
Over \$ 2,500,000 x 4 = \$ 125,000 (min) - \$ 300,000 (max)

The Contractor may requisition for one-half (1/2) of the Mobilization Payment upon satisfactory completion of the following:

1. Installation of any required field office(s).
2. Submission of all required insurance certificates and bonds.
3. Approval by the Department of Design and Construction of the coordinated progress schedule for the project and the Contractor's Shop Drawing schedule.

The remaining balance of the Mobilization Payment may be requisitioned only after 10 percent (10%) of the Contract price, exclusive of the total amount of Mobilization Payments made or to be made hereunder, shall have been approved for payment.

1.04 Contract Drawings

- A. SCHEDULE C - The Contract Drawings are listed in Schedule C, which is set forth in the Addendum to the General Conditions. Such drawings referred to in the Contract, and in the applicable Specifications for the various Contracts bear the general title:

City of New York
Department of Design and Construction
Division of Structures

- B. DOCUMENTS FURNISHED TO THE CONTRACTOR - After the award of the Contract, the Contractor for General Construction Work will be furnished with five (5) sets of paper prints of all Contract Drawings mentioned in Paragraph A above.
- C. PRINTS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

Each Contractor, other than the Contractor for General Construction Work referred to in Paragraph B, will receive two (2) sets of paper prints of all Drawings listed in Paragraph A and three (3) sets of paper prints of all Contract Drawings applying directly to each Contractor's own Contract.

- D. Each Contractor will receive nine (9) complete sets of Specifications.
- E. ADDITIONAL COPIES of Drawings and Specifications, when requested, will be furnished to the Contractor if available.
- F. COORDINATION AND COOPERATION - Since the Contracts are all related to the project, the Contractor shall consult and study the requirement of the Contract Drawings and Specifications of all Contracts furnished to the Contractor, 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.
- G. 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.
- H. COMPENSATION - Where Supplementary Drawings entail extra work, compensation therefor to the Contractor shall be subject to the terms of the "Contract". The Supplementary Drawings shall be binding upon the Contractor with the same force as the Contract Drawings.

- I. SUPPLEMENTARY DRAWING PRINTS - Three (3) copies of prints of these Supplementary Drawings will be furnished to the Contractor.
- J. COPIES TO SUBCONTRACTORS - The Contractor shall 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.
- K. CONTRACTOR TO CHECK DRAWINGS - The Contractor shall verify all dimensions, quantities and details shown on the Contract Drawings, Schedules, or other data received from the Commissioner, and shall notify the Commissioner of all errors, omissions, conflicts and discrepancies found therein. Notice of such errors shall be given before the Contractor proceeds with any work. Figures shall be used in preference to scale dimensions and large-scale drawings in preference to small-scale drawings.

1.05 Shop Drawings and Record Drawings

A. SHOP DRAWINGS

- 1. SUBMISSION OF SHOP DRAWINGS - For instructions relative to Shop Drawings involving electrical or mechanical work or equipment of any nature called for in any Contract, see the General Electrical Requirements and the General Mechanical Requirements.
- 2. SHOP DRAWINGS - The Contractor shall promptly prepare and submit layout detail and Shop Drawings of such parts of the work as are indicated in the Specifications or as required. These Shop Drawings shall be made in accordance with the Contract Drawings, Specifications and Supplementary Drawings, if any. The Shop Drawings shall 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, shall preferably be on sheets of the same size as the Contract Drawings, 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 shall be numbered consecutively and shall accurately and distinctly represent 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 thicknesses and finishes.
 - e. All other information required by the Commissioner.
- 5. TITLES AND REFERENCE - Shop Drawings shall 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, if any, under which it is, or they are required.
 - c. The locations or points 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.

NOTE: In addition to the above requirements, the Shop Drawings shall bear a stamp having the following wording:

FIELD MEASUREMENTS - The Contractor certifies that it has verified and supplemented the Contract Drawings by taking all required field measurements, that said measurements correctly reflect all field conditions and that this Shop Drawing incorporates said measurements.

6. THE SUBMISSION OF SHOP DRAWINGS - The Shop Drawings shall be accompanied by a letter of transmittal, in triplicate, containing the name of the Project, the name of the Contractor, the number of Drawings, titles and any other requirements. Re-submission of the same drawings shall bear the original number of the drawings and the original titles.
7. PRELIMINARY SUBMISSION - The Contractor shall submit one (1) set of sepia Shop Drawings to the Consultant Architect/Engineer for their approval. A satisfactory Shop Drawing will be stamped "Approved", be dated and one (1) copy thereof will be returned to the Contractor by letter. Should the Shop Drawing not be approved by the Consultant Architect/Engineer, the Commissioner will return the sepia Shop Drawings with the necessary corrections and changes to be made as indicated thereon.
8. REVISIONS - The Contractor must make such corrections and changes and again submit one (1) set of sepia drawings for the approval of the Consultant Architect/Engineer. The Contractor shall revise and resubmit the Shop Drawing as required by the Consultant Architect/Engineer until approval thereof is obtained. However, Shop Drawings which have been stamped "Approved As Noted" shall be considered an "Approved" Shop Drawing and NEED NOT be revised and resubmitted.

No work called for by the Shop Drawings shall be done until the approval of the said drawings by the Consultant Architect/Engineer is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractors which Shop Drawing indicated work related to, adjacent to, impinging upon, or affecting work to be done by other Contractors, shall be transmitted to the Contractors so affected. These approved Shop Drawings shall be delivered to the Resident Engineer for distribution to the affected Contractors at the job meetings and shall be so recorded in the minutes.

9. FINAL SUBMISSION - When approval of any Shop Drawing is obtained by the Contractor, it shall insert the date of the approval of the drawing and promptly furnish the Consultant Architect/Engineer with eight (8) additional prints of the approved Drawings. No work called for by the Shop Drawings shall be performed until the approval of the said drawings by the Commissioner is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractors which indicates work related to, adjacent to, impinging upon, or affecting work to be done by other Contractors, shall be transmitted to the Contractors so affected. These approved Shop Drawings shall be delivered to the Resident Engineer for distribution to the affected Contractors at the job meetings and shall be so recorded in the minutes.
10. VARIATIONS - If the Shop Drawings show variations from the Contract requirements because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in its letter of submittal. Approval of the Shop Drawings shall constitute approval of the subject matter thereof only and not of any structural apparatus shown or indicated.
11. CATALOGUE CUTS - Except as otherwise prescribed herein, the submission of catalogue cuts shall conform to the procedures specified for Shop Drawings.
- a. PRELIMINARY SUBMISSION - The Contractor shall submit three (3) sets of catalogue cuts to the Consultant Architect/Engineer to approve. A satisfactory catalogue cut will be stamped

"Approved", be dated and one (1) copy thereof will be returned to the Contractor by letter. Should the catalogue cut not be approved by the Commissioner, the Commissioner will return one (1) set of such catalogue cuts with the necessary corrections and changes to be made indicated thereon.

- b. REVISIONS - The Contractor shall make such corrections and changes and again submit four (4) sets of the catalogue cuts, in duplicate, for the approval of the Commissioner. The Contractor shall revise and resubmit the catalogue cuts as required by the Consultant Architect/Engineer until approval thereof is obtained.

However, catalogue cuts which have been stamped "Approved As Noted" shall be considered an "Approved" catalogue cut and need not be revised and resubmitted.

- c. FINAL SUBMISSION - When approval of any catalogue cut is obtained by the Contractor, it shall insert the date of the approval and promptly furnish the Consultant Architect/Engineer with four (4) additional sets of the approved catalogue cuts.
12. RESPONSIBILITY OF CONTRACTOR - The approval of Shop Drawings will be general and shall not relieve the Contractor of responsibility for the accuracy of such Shop Drawings, nor for the proper fitting and construction of the work, nor of the furnishing of materials or work required by the Contract and not indicated on the Shop Drawings. Approval of Shop Drawings shall not be construed as approving departures from the Contract Drawings, Supplementary Drawings or Specifications.
13. SHOP DRAWINGS AND MATERIAL SAMPLES SCHEDULE - The Shop Drawings and Material Samples Schedule is set forth in Schedule F, which is included in the Addendum to the General Conditions. Completion of this Schedule shall be in accordance with Article 1.41 (A) of these General Conditions.
14. PROCEDURE FOR PREPARING, FORWARDING, CHECKING AND RETURN - of all Shop Drawings shall be, generally, as follows:

The Contractor shall make available to its subcontractors the necessary Contract Documents and have them determine dimensions and conditions in the field, particularly with reference to coordination with other trades or work under other Contractors. The Contractor shall direct its subcontractors to prepare Shop Drawings for submission to the Consultant Architect/Engineer in accordance with the requirements of these General Conditions. The Contractor shall also direct its subcontractors to "Ring Up" corrections made on all re-submissions for approval, so as to be readily seen, and that the symbol "sub" be used to identify the source of the correction or information that has been added.

The Contractor shall:

- a. Review and be responsible to the Commissioner, or the Commissioner's authorized representative, for information shown on subcontractor's Shop and Installation drawings and manufacturers' date, and also for conformity to Contract Documents.
- b. "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.
- c. Clearly designate which trade 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 Consultant Architect/Engineer.
- d. Stamp submissions "Recommended for Approval", date and forward to the Commissioner or the Commissioner's authorized representative.

In order to expedite Shop Drawing procedures, the Contractor shall write a Shop Drawing status letter directly to the Consultant Architect/Engineer, each week, containing the following subject matter:

- (1) A list of all Shop Drawings which have been sent to but not returned by the Architect or Engineer giving name of the subcontractor, drawing number, title and date of submission.
- (2) An indication of the desired priority of the return, if necessary.

NOTE: The status letter shall be prepared and sent at a given time each week, preferably Friday afternoon, to enable the Consultant Architect/Engineer to receive the letter on Monday morning. This procedure shall be maintained throughout the active Shop Drawing period of construction.

B. INTEGRATED DRAWINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. The Contractor for General Construction Work shall provide to the Contractor for Heating, Ventilating and Air Conditioning Work reflected ceiling starting points or plans, beam soffit elevations, ceiling heights, roof openings, etc.
2. The Contractor for Heating, Ventilating and Air Conditioning Work shall prepare a drawing or drawings showing ductwork, heating and sprinkler piping. This drawing shall include location of grilles, registers, etc. and access doors in hung ceilings. Locations shall be fixed by elevations and dimensions from column center lines and/or walls.
3. The Contractor for Heating, Ventilating and Air Conditioning Work shall prepare and distribute to each of the other Contractors, the Resident Engineer and to the Consultant Architect a sepia of the above.
4. The Contractor for General Construction Work shall lay out on its sepia, the reflected ceiling plan, beam soffit elevations, ceiling heights, roof openings, etc.
5. The Contractor for Plumbing Work shall lay out its piping, valves, cleanouts, etc., indicating locations and elevations and shall indicate the necessary access doors.
6. The Contractor for Electrical Work shall indicate its fixtures, large conduit runs, clearances, pull boxes, junction boxes, sound system speakers, etc.
7. The Resident Engineer will call as many meetings with the Contractors as are necessary to resolve any conflicts that become apparent. The Resident Engineer will call on the services of the Consultant Engineer or Architect where necessary. The Resident Engineer is responsible for the coordination of the Contract Drawings.
8. Upon resolution of the conflicts, each Contractor shall enter its own work on the Resident Engineer's sepia, which will become the Master or Integrated Drawing. The Master Sepia shall be signed by each Contractor to indicate its acceptance of the arrangement of the work.
9. A reproducible copy of the Master Integrated Drawing or Drawings will be prepared and distributed by the Contractor for Heating, Ventilating and Air Conditioning Work to each Contractor and to the Consultant Architect for information.
10. Each Contractor shall prepare its Shop Drawings in accordance with the Integrated Drawings. No work will be permitted without approved Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.
11. Contractors shall be held strictly accountable for cooperation in preparing the Integrated Drawing or Drawings.

C. RECORD DRAWINGS

1. The Department of Design and Construction, at the start of construction (kick-off meeting), will furnish to each Contractor at no cost a complete set of Contract Document mylars pertaining to the work to be performed under its 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. The Contractor is required to furnish all other mylar drawings if necessary such as Addenda Drawings and Supplementary Drawings as may be necessary to indicate all work in detail as actually completed.

NOTE TO CONTRACTOR: All professional seals must be blocked out. Title box complete with project title and Consultants' names will remain.

2. Each Contractor shall maintain, during the progress of the work, an accurate record of the work as actually installed, on Record Drawings, on mylar, in ink. These Record Drawings shall be made available to the Resident Engineer upon request.

The Contractor's attention is particularly directed to the necessity of keeping accurate records of all subsurface and concealed work, so that the Record Drawings may contain this information in exact detail and location. Record Drawings should also show all connections, valves, gates, switches, cut-outs and similar operating equipment.

Before substantial completion payment, each Contractor shall furnish to the Commissioner one (1) complete set of mylar Record Drawings, in ink indicating all of the work and locations as actually installed, plus one (1) set of paper prints which will be furnished to sponsoring agency by Department of Design and Construction.

3. Record Drawings shall 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.
4. Each Record Drawing shall bear the legend "RECORD DRAWING" in heavy block lettering, one half (1/2) inch high, and contain the following data:

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. RECORD DRAWING TITLE SHEET - Each Contractor shall prepare a title sheet, the same size as Record Drawings, which shall contain the following:
 - a. Heading:
The City of New York
Department of Design and Construction
Division of Structures
 - b. Capital Budget Project Number (CAPIS 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
6. All changes from Contract Drawings shall be distinctly encircled and identified by Change Order number correlating to changes listed on the "Title Sheet." The Contractor shall show within the encircled areas the work as actually installed.
7. **BULLETINS, OPERATING AND SERVICE MANUALS** - Where the Contractor has submitted prints in the form of technical bulletins, operating and service manuals, or other printed matter as a Shop Drawing, having diagrams or drawings thereon of a material or equipment installed in the work, the Contractor shall furnish three (3) sets thereof so that the Commissioner may have all the necessary information for the proper operation maintenance and repair of the material and equipment and the ordering of spare parts. All bulletins and operating and service manuals shall be compiled and indexed in book form for each Contract.

1.06 Approval of Materials

- A. **LOCAL LAWS** - All materials, appliances and types or methods of construction shall be in accordance with the Specifications and shall in no event be less than that necessary to conform to the requirements of the Building Code of the City of New York, 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 shall be submitted to the Commissioner for approval, as early as possible, to afford proper review and analysis.
- C. **REPUTE OF MANUFACTURER** - No manufacturer will be approved for any materials to be furnished under the Contract unless it shall be of good reputation, shall have a plant of ample capacity and shall have successfully produced similar products. All required approvals for legal use of materials and equipment such as B.S.A. and M.E.A. must be obtained prior to installation.
- D. **ALL MATERIALS** - fixtures, fittings, supplies and equipment furnished under the Contract shall be new and unused, except as approved by the Agency, 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.
- E. **INFORMATION TO SUPPLIERS** - In asking for prices on materials under any item of the Contract, the Contractor shall 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 shall inform the manufacturer or dealer of all the General Conditions and requirements herein contained.
- F. **STANDARD REFERENCES** - Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for bids, even though reference has been made to an earlier standard.
- G. **REFERENCES** - Reference to a technical society, organization or body may be made in the Specifications by abbreviations in accordance with the following list:
 - A.I.A. for American Institute of Architects

A.C.I.	for American Concrete Institute
A.G.A.	for American Gas Association
A.G.M.A.	for American Gear Manufacturer Association
A.I.E.E.	for American Institute of Electrical Engineers
A.I.S.C.	for American Institute of Steel Construction
A.S.A.	for American Standards Association
A.S.T.M.	for American Society for Testing Materials
A.W.S.C.	for American Welding Society Code
A.W.W.A.	for American Water Works Association
B.S. & A.	for New York City Board of Standards & Appeals
C.I.P.R.A.	for Cast Iron Pipe Research Association
B.G. & E.	for Bureau of Gas & Electricity of the City of New York
FED. SPEC.	for Federal Specification
I.P.C.E.A.	for Insulated Power Cable Engineer's Association
NAVY SPEC.	for Navy Department Specification
N.E.C.	for National Electric Code
N.E.M.A.	for National Electrical Manufacturers Association
N.Y.B.C.	for New York City Building Code
N.Y.E.C.	for New York City Electrical Code
N.Y. SPEC.	for New York City Department of Purchase Specification
P.P.S.	for Power Piping Society
S.A.E.	for Society of Automotive Engineers Standards
S.H.B.I.	for Steel Heating Boiler Institute

H. 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.

I. SAMPLES OF MATERIALS - The Contractor shall submit to the Commissioner for approval, samples of all materials specified to be used in the project.

1. For samples of materials involving electrical work of any nature, see the General Electrical Requirements.
2. Samples shall be in triplicate, of sufficient size to show the quality, type, range of color, finish and texture of the material. However, in addition thereto, after approval, three (3) additional samples showing the material, color and texture of all interior finishes, including the finishes of exposed built-in equipment, trim, glazing, fittings and fixtures, etc., shall also be furnished. The sizes of these additional samples shall be as directed by and acceptable to the Commissioner.
3. Each of the samples shall be labeled, bearing the name and quality of the material, the Contractor's name, date, Contract and project, and the related Specification or Contract Drawing reference to the samples submitted.
4. A letter of transmittal, in triplicate, from the Contractor requesting approval must accompany all such samples.
5. Transportation charges to the Commissioner's office must be prepared on all samples forwarded.
6. Samples for testing purposes shall be as required in the Specifications.

J. SAMPLES ON DISPLAY - When samples are specified to be equal to samples in the office of the Commissioner, they shall be carefully examined by the bidders and by those whom the bidder expects to employ for the furnishing of such materials.

K. TIMELY SUBMISSIONS LOG/SCHEDULE - Samples shall 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 approval is received, in writing, from the Commissioner. All materials shall be furnished equal in every respect to the approved samples.

- L. THE APPROVAL OF ANY SAMPLES - will be given as promptly as possible, and shall be only for the characteristic color, texture, strength, or other feature of the material named in such approval, and no other. When this approval is issued by the Commissioner, 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 Commissioner, for the project.
- M. ACCEPTIBILITY OF TEST DATA - The Commissioner will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.
- N. 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.
- O. EQUIVALENT QUALITY OF MATERIALS - All materials and equipment which are designated in the Specifications by a number in the catalogue of any manufacturer or by a manufacturer's grade or trade name, are designated for the purpose of describing the article and fixing the standard or the quality and finish. Materials and equipment, which are, in the opinion of the Commissioner, the equivalent to that specified, will be acceptable.
- P. The submission of any material, or article, as the equal of the materials or articles set forth in the Specifications as a standard shall be accompanied by illustrations, drawings, descriptions, catalogues, records of tests, samples and any and all other information essential for judging the equality to the materials, finish and durability of that specified as standard, as well as information indicating satisfactory use under similar operating conditions.
- Q. MANUFACTURER'S DIRECTIONS - Where the Specifications provide that the manufacturer's directions are to be used, such printed directions shall be submitted to the Commissioner.
- R. COMMISSIONER TO SELECT INSPECTORS - Except as specifically provided in the Specifications, the Commissioner will select and designate all persons, firms, or corporations to make or witness each and every inspection, test or analyses, with or without reports.
- S. NOTICE - The Contractor shall 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 shall 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.
- T. NO SHIPPING BEFORE INSPECTION - The Contractor shall comply with the foregoing before shipping any material.
- U. CERTIFICATE OF MANUFACTURE - When the Commissioner so requires, the Contractor shall 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 shall 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 B.S.A., M.E.A., B.E.C. Advisory Board, etc.

- V. ACCEPTANCE - When materials or manufactured products shall comprise 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.
- W. TESTING COMPLIANCE - The testing personnel shall make the necessary inspections and tests, and the reports thereof shall 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.
- X. REPORTS - Six (6) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Commissioner as prerequisite for the acceptance of any material or equipment.
- Y. 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 without cost to the City.
- Z. FURNISH DESIGNATED MATERIAL - Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Specifications, the Contractor shall immediately proceed to furnish the designated material or equipment.
- AA. COST OF TESTS BORNE BY CITY - Where the City directs test 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.
- BB. COST OF TESTS BORNE BY CONTRACTOR - Where tests are specifically called for in the Specifications to be made by the Contractor, the cost thereof shall be borne by the Contractor and shall be deemed to be included in the Contract price. The expenses of the testing personnel assigned by the City shall not be the Contractor's obligation. The Contractor shall reimburse the City for expenditures incurred in the making of tests on materials and equipment submitted by the Contractor as the equivalent of that specifically named in the Specifications and rejected for non-compliance.

1.07 Delivery of Materials

- A. MATERIAL ORDERS - The Contractor shall furnish to the Commissioner a copy of each material order, indicating date of order and quantity of material, and shall also notify the Commissioner when materials have been delivered to the site and in what quantities.
- B. AMPLE QUANTITIES - The Contractor shall deliver materials in ample quantities to insure 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 shall be delivered with unbroken seals and shall bear proper labels.
- D. THE CONTRACTOR SHALL COORDINATE DELIVERIES - in order to avoid delaying or impeding the progress of the work of any related Contractor.
- E. STACKING - All materials shall be properly stacked in convenient places adjacent to the site, or where directed, and protected in a satisfactory manner. Stacked materials shall be so arranged as to not interfere with visibility of traffic control devices.
- F. OVERLOADING - If authority is given to store materials in any part of the project area, they shall be so stored as to cause no overloading.
- G. 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 shall remove and restack such materials at no additional cost to the City.

1.08 Temporary Structures

- A. **FIELD OFFICE FOR CONTRACTOR** - The Contractor shall establish a temporary field office for its own use at the site during the period of construction, at which readily accessible copies of all Contract Documents shall be kept.
- B. The field office shall 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** - In charge of each office there shall be a responsible and competent representative of the Contractor, duly authorized to receive orders and directions and to put them into effect.
- D. **TELEPHONE ARRANGEMENTS** - Arrangements shall be made by the Contractor whereby its representative may be readily accessible by telephone.
- E. **MATERIAL SHEDS** - used by the Contractor for the storage of its materials shall 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.
- F. **SUBSTANTIAL CONSTRUCTION** - All temporary structures shall be of substantial construction and neat appearance, and shall be painted a uniform gray unless otherwise directed by the Commissioner.
- G. **ADVERTISING PRIVILEGES** - The City reserves the right to all advertising privileges. The Contractor shall not cause any signs of any kind to be displayed at the site unless specifically required herein or authorized by the Commissioner.
- H. **CONTRACTOR'S SIGN** - The Contractor shall post and keep posted, on the outside of its field office, office or exterior fence or wall at site of work, a legible sign giving 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 event of an emergency at any time.

1.09 Surveys (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. **LINE AND GRADE** - The City will establish a baseline and bench mark near the site of the work for use of the Contractor in connection with the performance of the work.
- B. **RESPONSIBILITY** - The Contractor shall establish all other lines and elevations required for its work and shall be solely responsible for the accuracy thereof.
- C. **SAFEGUARD ALL POINTS** - Each Contractor shall safeguard all points, stakes, grade marks and bench marks made or established by the Contractor on the work, shall re-establish same if disturbed and bear the entire expense of rectifying the work improperly installed due to not maintaining, not protecting or removing without authorization such established points, stakes, or marks.
- D. **CITY MONUMENTS AND MARKS** - No work shall be performed near City monuments or marks so as to disturb them until the said monuments or marks have been referenced or reset or otherwise disposed of by the relevant Agency or party who installed them.
- E. **FOUNDATIONS** - The Contractor for General Construction Work shall 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 shall show the actual locations and the actual elevations of all the work in relation to the locations and elevations shown on the Contract Drawings, including but not restricted to the following:
 - 1. The locations and elevations of all piles, if any.

2. Elevations of tops of all spread footings, tops of pile caps, and tops of all foundation walls, elevator pit walls and ramp walls.
 3. Location of all footing centers and pier centers including those for exterior wall columns.
 4. Location of all foundation walls including wall columns, elevator pit walls and ramp walls.
- F. **WALL LINES** - After the first courses of masonry or stone have been laid, the Contractor for General Construction Work shall establish the permanent lines of exterior walls. Such Contractor shall furnish promptly, certification from a licensed Surveyor, in the form of signed original drawings showing the exact location of such wall lines, of all portions of all structures. Except at its own risk, the Contractor for General Construction Work shall 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, shall be a licensed Surveyor and shall be subject to the approval of the Commissioner. The Surveyor shall not be a regular employee of the Contractor, nor shall the Surveyor have any interest in the Contract. The Surveyor shall not be employed by the Contractor in laying out any work, it being intended that the Surveyor's certification shall represent an independent and disinterested verification of such layout. The Surveyor shall report to the Department of Design and Construction's 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 shall 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 drawings shall be noted on the final certificate and there shall be included any maps, plates, notes, pertinent documents and data necessary, in the opinion of the Commissioner, to constitute a full and complete report.
- I. **FINAL SURVEY** - The Contractor for General Construction Work shall submit to the Department of Design and Construction for submission to the Department of Buildings a final Survey by the licensed Surveyor showing the location of the new Structure, before completion of the Structure. This Survey shall 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 Structures on the plan, together with the location and boundaries of the lot or plot upon which the Structure is constructed, curb cuts, all yard dimensions, etc.

1.10 Contractor's Superintendent

- A. **SUPERINTENDENT** - The Contractor shall devote its time and personal attention to the work and shall employ and retain at the project site, from the commencement until the entire completion of the work, a Contractor's Superintendent competent and capable of maintaining proper supervision and care of the work and acceptable to the Commissioner, who, in the absence of the Contractor, and irrespective of any superintendent or foreman employed by any subcontractor, shall see that the instructions of the Commissioner are carried out.
- B. **REPLACEMENT** - The Contractor's Superintendent on the job shall not be changed or removed without the consent of the Commissioner.

1.11 Permits

The Contractor shall comply with all local, state and federal laws, rules and regulations affecting the Work of this Project, including, without limitation, (1) obtaining all necessary permits for the performance of the Work prior to commencement thereof, and (2) complying with all requirements for the disposal of demolition and/or construction debris, waste, etc., including disposal in City landfills. The Contractor shall be responsible for all costs in connection with such regulatory compliance, unless otherwise specified in the Contract.

1.12 Transportation

- A. AVAILABILITY - It shall be the duty of the Contractor to determine the availability of transportation facilities and dockage for the use of its employees, equipment and material and the conditions under which such use will be permitted.
- B. COSTS - If transportation facilities and dockage are available and are permitted to be used by the governmental agency having jurisdiction, the Contractor shall pay all necessary costs and expenses, and abide by all rules and regulations promulgated in connection therewith.
- C. VEHICLES - With respect to the use of vehicles on highways and bridges, the Contractor's attention is directed to the limitations set forth in the Rules of the City of New York, Title 34, Chapter 4, Section 4-15.
- D. CONTINUED USE - It is understood that the Commissioner makes no warranty as to the continued use by the Contractor of such facilities.

1.13 Sleeves And Hangers (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. COORDINATE TO PROGRESS SCHEDULE - Contractors required to furnish and install conduits, outlets, piping sleeves, boxes, inserts and all other materials and equipment necessary to be built into the work to be performed by the Contractor for General Construction Work, shall promptly furnish and set such sleeves or other materials in conformity with the requirements of the project.
- B. COOPERATION OF CONTRACTORS - All Contractors shall 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 - In the event that timely delivery of sleeves and other materials cannot be made, and to avoid delay, 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 Contractor for General Construction Work shall fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in shall be borne by the Contractor or Contractors responsible therefore.
- D. INSERTS - The Contractor for General Construction Work 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.

1.14 Cutting And Patching

- A. RESPONSIBILITY - Each Contractor shall 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 shall restore any work they damage that is the work of another Contractor.
- C. COMPETENT WORKERS - All restoration work shall 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 shall be replaced immediately by competent workers.
- D. 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 article on REMOVAL OF RUBBISH AND SURPLUS MATERIALS.

1.15 Temporary Heat (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

A. GENERAL

1. Definition - The provision of Temporary Heat shall mean 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 shall include the provision of heat to permit normal operations in such occupied areas.
 - a. The provision of Temporary Heat shall be in accordance with the temperature requirements set forth in Paragraph (c) below.
 - b. The provision of Temporary Heat shall 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 shall mean that minimum force required for the safe day to day operation of the system for the provision of Temporary Heat and shall include, without limitation, heating maintenance labor and/or Firewatch as required by NYC Fire Department regulations. Operating labor may be required seven (7) days per week and during other than normal 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 shall include the provision of domestic hot water at the same temperature as the system which is being replaced. Domestic hot water shall be provided in accordance with the phasing requirements set forth in the Contract Documents.
2. Responsibility - The Contractor responsible for the provision of Temporary Heat, and all expenses in connection therewith, shall 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 Paragraph (b) below, each Contractor shall be responsible for the provision of its own Temporary Heat.
 - (2) Post Enclosure - Once the Commissioner determines that the building, or any portion thereof, has been enclosed, as set forth in Paragraph B below, the Contractor for Heating, Ventilating and Air Conditioning Work ("HVAC Work") shall be 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). The Contractor for HVAC Work shall, within two (2) weeks of the kick-off meeting, submit to DDC for review its proposed plan to provide Temporary Heat. Such plan is subject to approval by the Resident Engineer. The Contractor for HVAC Work shall 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 Contractor for HVAC Work provided for herein is subject to the exception set forth in Paragraph H.3.b.(2) below.
 - b. Projects not involving Enclosure of the Building
 - (1) If the Project involves the installation of a new permanent heating system if one did not exist previously, or the replacement, modification and/or shut down of the existing

permanent heating system, or any key component thereof, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat, except as otherwise provided in Paragraph H.3.b.(2) below.

- (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 Paragraph H.3.b.(1) below, determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat and such Contractor shall be paid for the same in accordance with Paragraph H.3.b.(1).

B. ENCLOSURE OF STRUCTURES

1. Notification - The Contractor for General Construction Work shall notify all other Contractors and the Resident Engineer at least 30 days prior to the anticipated date that the building(s) will be enclosed.
2. Commissioner Determination - The Commissioner shall determine whether the building, or any portion thereof, has been enclosed. As indicated in Paragraph A above, once the building has been enclosed, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat. The Commissioner's determination with respect to building enclosure shall 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 shall 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 in Paragraph (c) below.
 - (2) Intermediate floor structures of multi-floor buildings shall 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 10 mil. plastic, 2) minimum 12 ounce waterproof canvas tarpaulins, or 3) a minimum three-eighths (3/8) inch thickness exterior grade plywood.
 - d. Temporary covers for openings shall be the responsibility of the Contractor for General Construction Work, and such work shall be deemed included in the Contractor for General Construction Work's bid price.

C. TEMPERATURE REQUIREMENTS

1. Unoccupied Buildings - The temperature requirement for the provision of Temporary Heat in unoccupied buildings shall be the GREATER of the following: 1) 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, shall be the GREATER of the following: 68 degrees Fahrenheit or the temperature requirement for the particular type of work set forth in the Contract Documents.

D. DURATION

1. The Contractor for HVAC Work shall be required to provide Temporary Heat 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 Contractor for HVAC Work shall be responsible for the provision of Temporary Heat for the time specified herein, regardless of any delays in completion of the Project, including delays that result in the commencement of the provision of Temporary Heat during a season that is later than that which may have been originally anticipated. The Contractor for HVAC Work shall include in its Total Bid 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 consecutive calendar days in Schedule A of the General Conditions. The Table set forth below indicates the number of full heating seasons that are deemed included in various contract durations, which are specified in consecutive calendar days (ccds). At a minimum, a full heating season shall extend from October 15th to April 15th.

Contract Duration	Full Heating Seasons Required
up to 360 ccds	1 full heating season
360 to 720 ccds	2 full heating seasons
more than 720 ccds	3 full heating seasons

E. METHOD OF TEMPORARY HEAT

1. The method of temporary heat shall be in conformance with all applicable laws, rules and regulations. Prior to implementation, such method shall be subject to the written approval of the Commissioner.
2. The method of temporary heat shall:
 - 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.
3. No open fires will be permitted.
4. Electric heating will not be permitted unless required by Contract Documents and Specifications or otherwise approved by the Commissioner.
5. Direct-fired equipment will be allowed in construction areas where the use of such equipment will not damage or deteriorate the construction or finishes or be harmful to persons working in the area.

F. TEMPORARY HEATING SYSTEM

1. The temporary system for the provision of Temporary Heat provided by the Contractor for HVAC

Work following enclosure of the building shall be complete including, but not limited to, torpedo blowers and/or propane heaters subject to provisions of paragraph E above), boilers and fuel storage, pumps, radiators, unit heaters, water and heating piping, insulation and controls. The temporary system for the provision of Temporary Heat shall be capable of maintaining the minimum temperature requirements set forth in Paragraph C above.

G. THE CONTRACTOR FOR GENERAL CONSTRUCTION WORK

1. The Contractor for General Construction Work shall coordinate with the Contractor for HVAC Work in the work of providing Temporary Heat, and shall so coordinate its operations as to insure sufficient and timely performance of the work under all Contracts. The Contractor for General Construction Work shall supply and pay for all water required and used in the building for the operation of the heating system(s) for the purpose of Temporary Heat. The Contractor for General Construction Work shall include all expenses in connection with the supply of water for Temporary Heat in its Total Bid Price. During the period in which Temporary Heat in an enclosed building is being furnished and maintained by the Contractor for HVAC Work, the Contractor for General Construction Work shall, in order to provide proper ventilating and drying, open and close the windows and other openings when necessary for the proper execution of the work and also when directed by DDC. The Contractor for General Construction Work shall maintain all permanent or temporary enclosures at its own expense.

H. THE CONTRACTOR FOR HVAC WORK

1. Use of Permanent Heating System for Temporary Heat after Building Enclosure
 - a. The Contractor for HVAC Work shall provide all labor and materials to promptly furnish and set all required equipment and 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 shall 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, shall be made by the Contractor for HVAC Work at his expense. The starting date for the warranty or guarantee period for such equipment shall be the date of Substantial Completion acceptance.
 - c. In the event that the Contractor for HVAC Work does not advance the installation of the permanent heating system in sufficient time to permit its use for Temporary Heat as determined by DDC, the Contractor for HVAC Work shall 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 shall be placed so as to comply with the requirements specified hereinbefore, and shall be connected, disconnected and suitably supported and located so as to permit construction work, including finish work such as wall plastering and painting, to proceed. The installation of the system for the provision of Temporary Heat by the Contractor for HVAC Work, including the placing of ancillary system equipment, shall be coordinated with the operations of all Contractors so as to insure sufficient and timely performance of the work of all Contractors. Once the permanent heating system is operating properly, the Contractor for HVAC Work shall remove all portions of the system for Temporary Heat which are not part of the permanent heating system.
3. Temporary Heat Allowance for Special Conditions or and/or Unforeseen Circumstances.
 - a. The City has established an allowance in the Contract for HVAC Work for payment of costs and expenses in connection with the provision of Temporary Heat as set forth herein. The amount of such allowance is set forth on the Bid Form for the Contract for HVAC Work and shall be included in the Total Bid Price of the Contractor for HVAC Work. The Contractor for HVAC Work shall 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 shall remain the sole property of the City. Should the amount of the allowance be insufficient to provide payment for the expenses specified below, the City will increase the amount of the allowance.

b. The allowance set forth herein may be utilized only under the conditions set forth below.

(1) In the event the Project does not involve the installation of a new permanent heating system if one did not exist previously, or the replacement, modification and/or shut down of the existing permanent heating system, or any key component thereof, and the Commissioner determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat, as directed by the Commissioner. The City shall pay such Contractor for all costs for labor, material, and equipment necessary and required for the same. Payment shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall 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 Contractor for HVAC Work have not sufficiently advanced the work of their contracts that is necessary and required to permit the Contractor for HVAC Work to use the permanent or other heating equipment for the provision of Temporary Heat, and (ii) the Contractor for HVAC Work does not bear any responsibility for such other Contractors' failure to advance the work, the City shall pay the Contractor for HVAC Work 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 shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall 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 Contractor for HVAC Work 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 Contractor for HVAC Work, the Contractor for HVAC Work shall provide the required maintenance of the permanent heating system for the period of time directed by the Commissioner. The City shall pay the Contractor for HVAC Work 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 shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall 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 shall be limited to the direct cost of such fuel. The Contractor for HVAC Work shall not be entitled to any overhead and/or profit for such fuel costs. In order to receive payment for such fuel costs, the Contractor for HVAC Work 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 Contractor for HVAC Work under the circumstances set forth in Paragraph b.(2) above, the Commissioner shall 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 shall be paid to the City by such other Contractor(s) immediately upon demand.

THE CONTRACTOR FOR ELECTRICAL WORK

1. The Contractor for Electrical Work shall be responsible for providing the items set forth below and shall include all expenses in connection with such items in its Total Bid Price. The Contractor for Electrical Work shall provide such items promptly when required and shall in all respects coordinate its work with the Contractor for General Construction Work and the Contractor for HVAC Work in order to facilitate the provision of Temporary Heat by the Contractor for HVAC Work.
 - a. The Contractor for Electrical Work shall 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 Contractor for Electrical Work shall 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 Contractor for HVAC Work. Such power shall be provided by the Contractor for Electrical Work for the duration the Contractor for HVAC Work is required to provide Temporary Heat, as set forth in Paragraph D above.
2. In providing the items set forth in Paragraph 1 above, the Contractor for Electrical Work is advised that labor may be required seven (7) days a week and/or during other than normal working hours for the period of time required by seasonal weather conditions.

J. THE CONTRACTOR FOR PLUMBING WORK

1. The Contractor for Plumbing Work shall 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 his Contract. The Contractor for Plumbing Work shall include all expenses in connection with such items of work in its Total Bid Price. The Contractor for Plumbing Work shall provide such items of work promptly when required and shall in all respects coordinate its work with the Contractor for General Construction Work and the Contractor for HVAC Work in order to facilitate the provision of Temporary Heat by the Contractor for HVAC Work.
2. In the event portions of the permanent plumbing equipment furnished by the Contractor for Plumbing Work as part of the work of his Contract are used for the provision of Temporary Heat by the Contractor for HVAC Work, either during construction or prior to acceptance by the City of the complete plumbing system, the Contractor for Plumbing Work shall be responsible to provide such plumbing equipment to the City in near perfect condition and shall make any repairs required, other than for ordinary wear and tear on the equipment, at his expense. The starting date for warranty and/or guarantee period for such plumbing equipment shall be the date of Substantial Completion acceptance by the City.
3. For Projects requiring the installation of new and/or modified gas service, as well as associated meter installations, the Contractor for Plumbing Work shall 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).

1.16 Scaffolding and Platforms

- A. **CONFORMANCE:** Unless otherwise indicated, the Contractor for General Construction is responsible for providing, erecting, installing and maintaining all temporary scaffolding and platforms which shall comply with requirements of Chapter 33 (Safeguards During Construction or Demolition) of the NYC Building Code, NYC Local Law 52 of 2005, OSHA Construction Standard 1926 Subpart L, and furnishing the following items.
- B. **RESPONSIBILITY**
 1. A Jobsite Monitor who shall be a competent person, designated and employed by the contractor who has a daily presence on the site during scaffold use. This designee must possess and

maintain a valid New York City Department of Buildings supported scaffold certificate of completion. An alternate shall also be designated, in the event that the Jobsite Monitor is absent. The Jobsite Monitor shall:

- a. Verify completeness of documentation and submittals (as described below).
 - b. Verify that inspections are performed, including pull tests (see below), reports are filed and reported deficiencies are corrected.
 - c. Monitor trades using scaffold.
 - d. Limit access to scaffold areas that are tagged for non-use.
 - e. Inform trades of scaffold load limitations.
 - f. Monitor loading of decks.
 - g. Verify that any ties that are temporarily removed are properly restored in the same shift.
 - h. Verify that outriggers and planks that are moved are properly set up and secured.
 - i. Verify that all scaffold decks in use have proper access/egress.
 - j. Verify that all open sides of decks in excess of 14 inches have proper guardrails and toe-boards.
 - k. 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.
 - l. Keep a log of significant actions and events connected with the scaffolding.
2. The Contractor shall be responsible for erection, maintenance and dismantling of the scaffold / shed in conformance with the New York City Building Code and OSHA requirements, contract documents and engineering specifications. The Contractor shall also be guided by generally accepted standards of scaffold industry practice as promulgated by the Scaffold Industry Association.
 3. Scaffold Engineer is a New York State licensed PE engaged by the scaffold contractor / erector and responsible to ensure that the installation design conforms to the New York City Building Code and OSHA requirements, that the design comports with the capabilities of the components and the characteristics of the site, that scaffold loads on the host building, including netting, have been properly considered and that the design documents communicate information for erectors and users.
 4. Scaffold users are trade contractors assigned to work on the scaffold. Training certificates from a New York City Department of Buildings approved training provider are mandatory. These users have the duty to become familiar with the New York City Building Code and OSHA requirements germane to users, to obey the instructions of the Jobsite Monitor and inform the Jobsite Monitor of known hazards, non-conformances or violations.

C. JOBSITE DOCUMENTATION AND SUBMITTALS:

1. NYC Department of Buildings 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;
2. Site logistics plan / site safety plan;
3. Installation drawing(s), design and product data to be provided for all scaffold(s) and shed(s) must include, at a minimum:
 - a. Plan(s);
 - b. Elevation(s);
 - c. Duty load designation; "standard" (150 psf live load) or "heavy duty" (300 psf live load).
 - d. Details including base support, anchors and ties;
 - e. Notes and specifications including load limits, number of planked levels, tie spacing, netting, and sequence of installation and removal.
 - f. Anchorage into sound material.
 - g. Load limits based on pull tests;
 - h. Specifications for pull test(s), method, proof load and the number of trials;
 - i. Elevations, levels or heights, where anchorage is made into masonry;

- j. Specifications for frames, planks, screw jacks, anchors, and any other ancillary hardware;
- k. Samples for anchors, ties and netting;
- l. Sequence of operations for erection and demolition;
- m. Location plan, heights, widths, "jumps" over doorways and driveways;
- n. Specify size, maximum span and maximum spacing of headers and stringers;
- o. Specify legs, girts, braces, nailing and connections;
- p. All sidewalk sheds shall be designed, engineered, signed and sealed by a Professional Engineer licensed in the State of New York;
 - 1) Generic (not job specific) engineering drawings are satisfactory for standard sheds and arrangements.
 - 2) Special engineering is required for custom sheds, site-specific problems or non-standard arrangements.

D. INSPECTIONS:

1. Signed inspection reports shall be issued for each inspection and pull-test below, and shall be logged and maintained on site by the Jobsite Monitor for the duration of the project.
2. Pull testing shall be required during design, and during or post erection, where anchorage is made into masonry. The Scaffold Engineer shall specify the test method, proof load and the number of trials.
3. Sidewalk sheds shall be inspected after initial installation, major modification, or damage and thence every three months. Inspections shall be by a Scaffold Engineer for custom sheds and by a competent person employed by the Contractor for standard sheds.
4. Scaffolds shall be inspected by the Scaffold Engineer during erection, post-erection and prior to use and thence every three months. The Scaffold Engineer shall repeat inspections after major alteration/modification, damage.
5. A qualified person assigned by the Contractor shall 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.
6. A qualified person assigned by the Contractor shall 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.
7. Scaffolds shall be inspected daily by the Jobsite Monitor or alternate prior to use by scaffold users.
8. At the completion of the project, submit all inspection documents to the Commissioner for record purposes.

E. LADDERS AND STAIRS: The Contractor for General Construction Work shall 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.

F. ACCESS AND EXITS: The ladders or temporary stairs shall 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.

1.17 Hoists and Hoistways

A. RESPONSIBILITY - The Contractor for General Construction Work shall provide adequate numbers of material hoists for the most expeditious performance of all parts of its 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 Contractor for General Construction Work for the use of its hoist upon such terms and conditions as it may prescribe.

- B. LOCATIONS - No hoists shall be constructed at such locations as will 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 shall 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 meets with the Building Code of the City of New York and the approval of the Commissioner, and providing further it entails no interference with the progress of the work of any Contractor.
- D. PROTECTION FOR INTERIOR HOISTS - All interior material hoistways shall be enclosed on each floor and shall be adequately protected with appropriate safety guards. In no event shall the protection be less than that required by law.

1.18 Certificates of Approval

- A. RESPONSIBILITY - Each Contractor shall be responsible for and shall 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 shall be forwarded to the Commissioner through the Resident Engineer before final acceptance of the work of the Contract.

1.19 Acceptance Tests

- A. GOVERNMENTAL AGENCIES - All equipment and appliances furnished and installed under the Contract shall conform with the requirements of the Specifications, and shall 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 TEST - Whenever the Specifications and/or any governmental agency having jurisdiction requires the acceptance test, the Contractor shall give written notice to all concerned 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 shall 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 shall 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 Controlled 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 shall only proceed as directed by the Resident Engineer. Additional costs resulting from retesting, reinspecting, replacing of material and/or damage to the work of other trades and any delay caused to the schedule shall be borne by the Contractor.

1.20 Progress Photographs (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. PHOTOGRAPHER - The Contractor for General Construction Work shall employ and pay for the services of a competent photographer who shall take photographs showing the progress of the work.
- B. PHOTOGRAPHS - There shall be four (4) photographs taken each month from the commencement of the Contract to the time of completion. These photographs shall show as far as possible, the work

completed within and on the exterior of the structure. The first series of photographs shall be taken prior to the actual commencement of work at the site. In addition thereto before final payment, there shall be six (6) photographs taken of unobstructed views of the completed project or projects and site, as directed by the Commissioner and after all scaffolding, hoists, shanties, field offices or other temporary work has been removed and final cleaning done. (For demolition work included in the Contract there shall be four (4) photographs taken before commencement of demolition operations; four (4) at the mid-point of operations; and four (4) at the completion of demolition operations). The prints shall be 8" x 10" gloss finish, mounted with a one (1) inch binding flap of muslin on the left side. They shall be marked on the back with date of exposure; the title of the project; and the specific location. Three (3) copies of each photograph shall be furnished free of charge to the Department of Design and Construction. Photographs shall be taken as ordered by the Commissioner.

1.21 Job Meetings

- A. **MEETINGS SCHEDULE** - Meetings shall be held as scheduled by the Resident Engineer in his office at the site, at which time Contractors for all separate Contracts shall have their representatives present to discuss all details relative to the execution of the work.
- B. **ACCOMODATIONS** - The Contractor for General Construction Work shall provide ample tables and chairs to accommodate all present at the meetings, and table space for Contract Drawings.
- C. **AGENDA** - The Resident Engineer shall preside over these meetings. 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.

The Contractor for General Construction Work shall furnish all necessary typing and printing of the minutes prepared by the Consultant Architect/Engineer. Ample copies of the printed minutes shall be furnished to the Resident Engineer for distribution to all Contractors and representatives of the Commissioner.

- D. **COORDINATION** - Job meetings shall also be called by the Contractor for General Construction Work 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 Contractor for General Construction Work, be held at the same place and immediately following the Job Meetings held by the Resident Engineer. Minutes of these meetings shall be recorded, typed and printed by the Contractor for General Construction Work and distributed to all parties concerned.

1.22 Guarantees and Warranties - Refer to the Addendum to the General Conditions for the applicability of this article.

- 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 to the General Conditions.
- B. **FORM** - For all guarantee requirements set forth in Schedule B, the Contractor shall provide a written guaranty, in the form set forth on the following page.

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

Subscribed and sworn to before me this

day of _____, year _____

Notary Public

1.23 Removal of Rubbish and Surplus Materials

- A. **RUBBISH** - Rubbish shall not be thrown from the windows or other parts of the project. Mason's rubbish, dirt and other dust-producing material shall be wetted down periodically.
- B. **LOCATION** - Each Contractor shall sweep up and deposit, at a location designated on each floor by the Contractor for General Construction Work, all of its rubbish, debris and waste materials, as it accumulates and when directed by the Resident Engineer. Wood cratings shall be broken up, neatly bundled, tied and stacked ready for removal and be deposited at a location designated on each floor by the Contractor for General Construction Work.
- C. **LABORERS** - The Contractor for General Construction Work shall be responsible for the removal of all rubbish, etc., from the site. The Contractor shall remove from the designated locations all piles of rubbish, debris, waste material and wood cratings as they accumulate and when directed by the Resident Engineer, and shall remove them from the site. The Contractor shall employ and keep engaged for this purpose an adequate number of laborers.
- D. **SURPLUS MATERIALS** - Each Contractor shall remove from the site all surplus materials when there is no further use for same.
- E. **TOOLS AND MATERIALS** - At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly removed.

1.24 Cleaning

Each Contractor shall thoroughly clean all equipment and materials furnished and installed and shall deliver such materials and equipment undamaged in a clean and new appearing condition at time of substantial completion.

1.25 Inspections by Other City Agencies

- A. **LETTER OF COMPLETION** - Just prior to substantial completion of this 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 inspectional staff of the Department of Buildings 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.

1.26 Security Guards/Fire Guards on the Site (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

A. SECURITY GUARDS (WATCHMEN)

- 1. The Contractor for General Construction Work shall provide competent Security Guards on the site until final completion of the project or earlier if so notified in writing by the Commissioner. The Security Service shall commence with the start of work. There shall be no less than one (1) Security Guard on duty every day, including Saturdays, Sunday and Holidays, 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 trades. This exception during the working day shall not apply after the finishing painting of the plaster work is commenced; thereafter, not less than one (1) Security Guard shall be on duty continuously, 24 hours a day, until final completion of the project or earlier if so notified in writing by the Commissioner.

2. Every Security Guard shall be required to hold a "Certificate of Fitness" issued by the Fire Department. Every Security Guard shall, during their tour of duty, perform the duties of Fire Guard in addition to their security obligations.
3. Should the Commissioner find that any Security Guard is unsatisfactory, such guard shall be replaced by the Contractor for General Construction Work upon the written demand of the Commissioner.
4. Each Security Guard furnished by the Contractor for General Construction Work shall be instructed by the Contractor for General Construction Work to include in their duties the entire construction site including the Field Office, temporary structures, and equipment, materials, etc.
5. Should the Contractor for General Construction Work or any other Contractor consider the security requirements outlined above inadequate, it shall 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 Article shall 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 Contractor for General Construction Work shall employ Security Guards/Fire Guards at all times, 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 shall be borne by the Contractor for General Construction Work.

C. **RESPONSIBILITY** - All Contractors will be responsible for safeguarding and protecting their own work, materials, tools and equipment.

1.27 Contractor's Daily Reports

A. **DAILY REPORTS** - As soon as the Contractor has started work on the Project, it shall submit to the Resident Engineer written daily reports of the work performed the previous day by any of its employees, including the employees of its subcontractors.

B. **INFORMATION** - The reports shall be prepared by the Contractor's Superintendent and shall bear the Contractor's Superintendent signature. Each report shall contain the following information:

1. The type of materials and/or major equipment being installed by the Contractor and the total number of employees working in each category on that particular day.
2. The names of the subcontractors working and the type of materials and/or major equipment being installed by each, together with the total number of employees working for each subcontractor on that particular day.
3. The major construction equipment being used by each Contractor and/or subcontractor.

1.28 Alternate or Substitute Equipment

A. In general, the Contract Drawings and Specifications show and describe arrangements suitable for the specific items of equipment either named or described. In the event that a Contractor submits for approval, and receives such approval, a device or piece of equipment which requires connections (vacuum, gas, steam, water, air, electric, etc.) or arrangements of these services, differing from those indicated or described in the Contract Documents, it shall be incumbent upon the Contractor submitting the alternate or substitute equipment to give timely notice to the other Contractors involved so that they may make suitable alterations in the work to accommodate the substitute or alternate equipment. The Contractor making the substitution shall be responsible for any and all additional

costs incurred by any of the Contractors by virtue of the substitution of equipment for the equipment named or described in the Contract Documents.

1.29 Sleeve and Penetration Drawings (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

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 Contractors for the engineering trades (Plumbing, Heating, Ventilating and Air Conditioning, and Electrical) shall submit to the Department of Design and Construction 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 that it may be determined if such penetrations will materially weaken the project's structure. The sketch will be stamped and returned if approved and/or comments will be transmitted. The engineering Contractors shall continue to submit sketches as the pouring schedule and the concrete work progresses and, until approvals for the penetration sketches have been given, shall not predicate their layout work on unapproved sketches.

1.30 Location of Partitions (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

A. Within three (3) weeks after the concrete slabs have been poured on each floor level, the Contractor for General Construction Work shall immediately locate accurately all of the partitions, including the door openings, on the floor slabs in a manner approved by the Resident Engineer.

1.31 Furniture and Equipment

A. RESPONSIBILITY - Each Contractor is responsible for moving all loose furniture and/or equipment in all areas when 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.

1.32 Overtime Work (Ordered by Commissioner)

A. OVERTIME - The Commissioner reserves right to order and pay for overtime work.

1. The Commissioner can order overtime work when in the Commissioner's opinion, delay occurs and such delay is not the fault of the Contractor, or
2. When work is of such an important nature that delay in carrying such work to completion would result in serious disadvantage to the public.

B. ORDER FOR OVERTIME WORK - When overtime work is ordered by the Commissioner, such "Order" will be issued by the Commissioner on a special form letter over the signature of the Commissioner.

C. CONTRACTOR'S PROCEDURE PRIOR TO COMMENCING WORK

1. Make immediate application to the Commissioner of Department of Labor, State of New York, for dispensation in accordance with Subdivision 2 of Section 220 of the Labor Law.
2. Upon receipt of such dispensation, proceed expeditiously with ordered overtime work.

1.33 Compliance with OSHA Regulations

These Contract Documents and the work hereby contemplated shall be governed, at all times, by the following Federal Laws:

A. William Steiger Occupational Safety and Health Act of 1970, Public Law 91-596;

- B. Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;
- C. Part 1926 - Safety and Health Regulations for Construction, Chapter XVII of Title 29, Code of Federal Regulations.

1.34 Temporary Services

PART A (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

A. TEMPORARY WATER - during construction shall be furnished in the following manner:

1. Immediately after the Contractor for General Construction Work has been ordered by the Commissioner to start work, it shall file an application with the Dept. of Environmental Protection for the schedule of charges for water use during construction. The Contractor for General Construction Work will be responsible for payment of water charges.
2. Immediately after the Contractor for Plumbing Work has been ordered by the Commissioner to start work, it shall file an application with the Department of Environmental Protection's Bureau of Water Supply and obtain its permit to install the temporary water supply system. The system shall be installed and maintained for the use of all Contractors. A copy of the above mentioned permit shall be filed with the Commissioner. The Contractor for Plumbing Work shall provide temporary water main, risers and waste stacks as directed and install on each floor, outlets with two (2) 3/4" hose valve connections over a barrel installed on a steel pan. The Contractor for Plumbing Work shall provide drains from the pans to the stack and house sewer and hose bibs to drain the water supply risers and mains. During winter months the Contractor for Plumbing Work shall take the necessary precautions to prevent the temporary systems from freezing.

B. TOILET FACILITIES - both exterior and interior, for the use of all Contractors, shall be furnished and installed in the following manner:

1. Toilet fixtures shall be furnished, installed and maintained in a satisfactory operating condition by the Contractor for Plumbing Work.
2. Enclosures for the toilet fixtures shall be erected and maintained by the Contractor for General Construction Work.
3. Heating for the enclosures shall be furnished, installed and maintained by the Contractor for General Construction Work.
4. Electric lighting for the enclosures shall be furnished, installed and maintained by the Contractor for Electrical Work.
5. The Contractor for General Construction Work shall keep the temporary toilet fixtures and enclosures in a clean and sanitary manner.
6. No Contractor shall cause any sanitary nuisances to be committed by its employees in or about the work. Each Contractor shall enforce all sanitary regulations of the City and State Health Authorities.

C. OVERTIME USE - Whenever any Contractor(s) work before or after the regular work hours hereinafter specified under Subparagraph D, or on a Saturday, Sunday or Holiday of any trade, such Contractor(s) shall pay the Contractor for Plumbing Work 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 shall 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 D shall apply.

- D. **ACTIVATION** - The Contractor for Plumbing Work shall 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 Contractor for Plumbing Work or until the services are terminated by instructions from the Commissioner.

PART B (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. **WATER** - The Contractor for General Construction Work will be responsible for payment of water charges. Billing will be in accordance with the Department of Environmental Protection schedule of charges for Building Purposes.
- B. **ELECTRICITY** - for temporary light and the operation of small tools, is available in the area of this project and will be furnished to the Contractor for General Construction Work by the Contractor for Electrical Work without cost.
- C. **TOILET FACILITIES** - The Contractor for General Construction Work shall arrange with the Commissioner for the temporary use of certain toilets or washrooms within the project for the use of all employees during the execution of the work.
- D. **MAINTENANCE** - The Contractor for General Construction Work shall maintain the temporary toilet facilities in a clean and sanitary manner and make all necessary repairs due to misuse.
- E. **NUISANCES** - The Contractors shall not cause any sanitary nuisance to be committed by its employees in or about the work, and shall enforce all sanitary regulations of the City and State Health Authorities.

1.35 Temporary Use, Operation and Maintenance of Elevators during Construction

PART A - FOR NEW BUILDINGS UP TO AND INCLUDING 15 STORIES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. **INSTALLATION** - The Contractor for General Construction Work shall install and complete, as indicated herein, one (1) selected main elevator in the Project for temporary operation by the Contractor for General Construction Work for the transporting of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction of work at the project. The Contractor for General Construction Work shall furnish, install and maintain for such elevators, 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 and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.
- B. **RESPONSIBILITY** - The Contractor for General Construction shall 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. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of the temporary elevator or parts utilized in connection therewith, if required.

- C. **ACTIVATION TIME** - The Contractor for General Construction Work shall keep the temporary elevator 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 the aforementioned trades.
- D. **COMMENCEMENT OF SERVICE** - The Contractor for General Construction Work shall begin to provide temporary elevator service using the selected main passenger elevator no later than eight (8) weeks (40 working 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 (15 working days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed the following work shall have been completed:
1. The shaft shall have been completely enclosed by either the permanent or a temporary enclosure meeting the requirements of the law.
 2. The machine room shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
 3. There shall have been installed on all floors at the shaftway entrances to the elevator, solid substantial frames and either sliding or swing doors with substantial hardware and door locks and any necessary approved wire mesh barricades for adjacent shaftways.
 4. There shall have been furnished and installed solid substantial enclosures at front, back, sides and top of car platform enclosure, with emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.
- E. **ELECTRICAL INSTALLATION** - The Contractor for Electrical Work, not later than 20 calendar days after the machine room roof slab or that portion of its surrounding the elevator has been placed, shall have furnished and installed temporary or permanent power and light feeders as required for the elevator used for temporary service and shall have connected 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 shaftway and for the car control and signal traveling cables. The Contractor for Electrical Work shall make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.
- F. **REMOVAL** - When elevators for permanent use have been installed and are in condition for service, and when directed by the Commissioner, the Contractor for General Construction Work shall remove the temporary enclosures and all temporary elevator equipment and promptly proceed with the installation of the permanent equipment as is required under the Contract.
- G. **INSPECTION** - Before temporary elevator equipment has been removed, a joint inspection of the equipment shall be made by the Contractor for General Construction Work and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection deems it necessary, the Contractor for General Construction Work shall furnish and install new governor and compensating ropes, new traveling cables and new controller parts, etc. The car and counterweight safeties shall 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 shall be installed and payment therefor will be made in accordance with Article 26 of the Contract.
- H. **REPLACEMENT** - The Contractor for General Construction Work shall replace with new, any of the equipment or parts of the temporary elevator installation that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheave spaces used for temporary operation of elevators shall be thoroughly

cleaned. Where lubricated rails are used they shall 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., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.

- I. COSTS - The Contractor for Electrical Work shall pay the costs of all electrical current used for operating the temporary elevators. The Contractor for General Construction Work shall provide all necessary conduit and wiring connections for the proper operation of the elevator and the signaling of the temporary elevators.
- J. LIMITATIONS OF USE - The temporary elevator shall not be used during its operation for hoisting of materials or removal of rubbish; but shall be limited only to the transportation of employees of all Contractors and the representatives of City Departments 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 shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall 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).
- K. PAYMENT FOR USE - The Contractor for General Construction Work shall 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 Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
- L. LIQUIDATED DAMAGES - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide the temporary elevator service described in this section beginning with the 41st working day after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed and stripped. This charge will be deducted from any amount due and owing to the Contractor for General Construction Work.
- M. OVERTIME USE - All Contracts. Whenever any Contractor or Contractors work before or after the regular work hours as indicated in Paragraph B above, or on a Saturday, Sunday or Holiday, such Contractor or Contractors shall pay the Contractor for General Construction Work for the operation and maintenance of the temporary elevator, if required by such Contractor or Contractors, at the daily rate indicated in the Contract but increased to reflect the difference between regular wage rates and overtime wage rates. The basic hourly charge shall be considered as one ninth (1/9) of the amount shown in the Item of the Bid form of the General Construction Work Contract. The City will not pay any Contractor for such overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.

PART B - FOR NEW BUILDINGS OVER 15 STORIES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. INSTALLATION - The Contractor for General Construction Work shall install and complete, as indicated herein, two (2) selected main elevators in the Project for temporary operation by the Contractor for General Construction Work for the transporting of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction over work at the project. The Contractor for General Construction Work shall furnish, install and maintain for such elevators, 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 and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall 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 will not be operated simultaneously.

- B. **RESPONSIBILITY** - The Contractor for General Construction shall 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. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of the temporary elevator or parts utilized in connection therewith, if required.
- C. **ACTIVATION TIME** - The Contractor for General Construction Work shall keep the temporary elevator 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 the aforementioned trades.
- D. **LOW RISE ELEVATOR** - The Contractor for General Construction Work shall begin to provide temporary elevator service using one (1) selected main passenger elevator no later than six (6) weeks (30 working days) after the 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) working days, after the 12th Floor slab, or that portion of it surrounding the elevator shaft, has been placed and stripped the following work shall have been completed:
1. The shaft shall have been completely enclosed up to the 12th Floor by either the permanent or a temporary enclosure meeting the requirements of the law.
 2. A temporary machine room enclosure shall have been provided at the 11th Floor and shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
 3. There shall have been installed on all floors up to and including the 9th Floor at the shaft entrances to the elevator, solid substantial wood frames and either sliding or swing doors with substantial hardware and door locks, also any necessary approved wire mesh barricades for adjacent shaftways.
 4. There shall have been furnished and installed solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.
- E. **ELECTRICAL INSTALLATION** - The Contractor for Electrical Work, not later than 10 calendar days after the 12th Floor slab or that portion of it surrounding the elevator, has been poured and stripped, shall have furnished and installed temporary or permanent power and light feeders as required for the elevator used for temporary service and shall have connected such feeders to the terminals on the starter panels or controllers in the temporary machine room, to the low voltage transformers and car light outlets in the center of the shaftway and for the car control and signal traveling cables. The Contractor for Electrical Work shall make all these required connections as soon as the Equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.
- F. **HIGH RISE ELEVATOR** - The Contractor for General Construction Work shall begin to provide temporary elevator service to all floors, using a selected main passenger elevator, no later than eight (8) weeks (40 working 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 (15 working days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed, the following work shall have been completed:

1. The shaft shall have been completely enclosed by either the permanent or temporary enclosure, meeting the requirements of the law.
2. The machine room shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
3. There shall have been installed on all floors at the shaftway entrances to the elevator, solid substantial frames and either sliding or swing doors with substantial hardware and door locks, also any necessary approved wire mesh barricades for adjacent shaftways.
4. There shall have been furnished and installed, solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.

G. The Contractor for Electrical Work, not later than 20 calendar days after the machine room slab or that portion of it surrounding the elevator shaft has been placed, shall have furnished and installed temporary or permanent power and light feeders as required for the high rise elevator to be used for temporary service and shall have connected 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 shaftway.

The Contractor for Electrical Work shall make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.

- H. When the high rise elevator is completed and ready for temporary operation, the low rise temporary elevator shall be shut down.
- I. When one (1) or more elevators for permanent use have been installed and are in condition for service, and when directed by the Commissioner, the Contractor for General Construction Work shall remove the temporary enclosures and all temporary elevator equipment, and promptly proceed with the installation of the permanent equipment as is required under the Contract.
- J. Before temporary elevator equipment has been removed, a joint inspection of the equipment shall be made by the Contractor for General Construction Work and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection determines it necessary, the Contractor for General Construction Work shall furnish and install new governor and compensating ropes, new traveling cables, new controller parts, etc. The car and counterweight safeties shall 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 shall be installed and payment therefor will be made in accordance with Article 26 of the Contract.
- K. The Contractor for General Construction Work shall replace with new, any of the equipment or parts of the temporary elevator installations that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheaves spaces used for temporary operation of elevators shall be thoroughly cleaned down. Where lubricated rails are used they shall 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., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.
- L. The Contractor for Electrical Work shall pay the costs of all electrical current used for operating the temporary elevators. The Contractor for General Construction Work shall provide all necessary conduits and wiring connections for the proper operation of the elevators and the signaling of the temporary elevators.

- M. No temporary elevator shall be used during its operation for hoisting of materials or removal of rubbish, but shall be limited only to the transportation of employees of all Contractors and the representatives of City Departments and other governmental agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specific 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 time as all plastering has been completed from the second floor up. The particular Contractor using the elevator for the hoisting of its material shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall 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 other Contractors.
- N. The Contractor for General Construction Work shall 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 Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
- O. LIQUIDATED DAMAGES - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide the temporary elevator service described in this Section beginning with the 31st working day after the 12th Floor slab, or that portion of the 12th Floor slab surrounding the elevator shaft, has been placed and stripped. This charge will be deducted from any amount due and owing to the Contractor for General Construction Work.
- P. OVERTIME USE - ALL CONTRACTS. Whenever any Contractor(s) work before or after the regular work hours as indicated in Subparagraph B above, or on a Saturday, Sunday or Holiday, such Contractor or Contractors shall pay the Contractor for General Construction Work for the operation and maintenance of the temporary elevator, if required by such Contractor or Contractors, at the rate indicated in the Item of the bid form of the General Construction Work Contract but increased to reflect the difference between regular wage rates and overtime wage rates. The basic hourly charge shall be considered as one ninth (1/9) of the amount shown in the item of the General Construction Work Contract. The City will not pay any Contractor for such overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.

PART C - EXISTING BUILDINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. The Contractor for General Construction Work may use, at the Commissioner's discretion, one (1) selected elevator in the project for temporary operation by the General Construction Work Contractor for the transportation of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction over work at the Project. The Contractor for General Construction Work shall maintain for such elevators, all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices hand reset target annunciators, signal devices, and all other permanent or temporary parts. The installation and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.
- B. The Contractor for General Construction shall 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. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of

the temporary elevator or parts utilized in connection therewith, if required.

- C. The Contractor for General Construction Work shall 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. The Contractor for General Construction Work shall replace with new any of the equipment or parts of the elevator for temporary operation installation that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheave spaces used for temporary operation of elevators shall be thoroughly cleaned down. Where lubricated rails are used they shall 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., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.
- E. The elevator for temporary operations shall be used during its operation for hoisting of materials or removal of rubbish, but shall be limited only to the transportation of employees of all Contractors and the representative of City Departments 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 shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall give notification in writing to the Resident Engineer of any alleged employee for the hoisting of materials by the particular Contractor(s).
- F. The Contractor for General Construction Work shall pay all costs for the operation and maintenance of the elevator for temporary operation. All other costs in connection with the elevator and equipment excepting electrical work done by the Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
- G. **LIQUIDATED DAMAGES** - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide elevator services described in this section beginning with 15 consecutive calendar days from notice to proceed. This charge will be deducted from any amount due and owing to the Contractor for General Construction Work.
- H. **OVERTIME USE - ALL CONTRACTS** - Whenever any Contractor(s) work before or after the regular work hours as indicated in Paragraph B above, or on a Saturday, Sunday or Holiday, such Contractor(s) shall pay the Contractor for General Construction Work for the operation and maintenance of the elevator, if required by such Contractor(s) at the union daily rates but increased to reflect the difference between regular wage rates and overtime wage rates. The City will not pay any Contractor for overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.

1.36 General Mechanical Requirements (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. The General Mechanical Requirements contained herein shall be followed by all Contractors furnishing mechanical equipment under their respective Contracts.
- B. **CONCEALED PIPING** - and ducts shall mean 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 shall be installed in the hung ceilings.
- C. **THE 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. The Contractor shall follow these Contract Drawings in laying out the work and shall consult the Contract Drawings of the other Contracts to become familiar with all conditions affecting it and to verify the spaces in which it will be installed. The Contractor shall cooperate with the Public Utilities doing certain necessary work for this project. The attention of the Contractor is called to the Contract Drawings for General Construction Work for the location, arrangement and extent of plumbing and other fixtures and equipment. All work shall be installed in locations as shown on these Contract Drawings.

- D. **CERTIFICATES** - On completion of the work, the Contractor shall obtain certificates of inspection, approval, acceptance and of compliance with all laws from all agencies and/or entities having jurisdiction over the work and shall deliver these certificates to the Commissioner. The work shall not be deemed substantially complete until the certificates have been delivered.
- E. **SHOP DRAWING SUBMITTALS** - Contractors doing mechanical work shall submit, as directed, Shop Drawings, roughing drawings, manufacturer's Shop Drawings, field drawings, cuts, bulletins, etc., of all materials, equipment and methods of installation shown or specified.
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.
- F. **ACCESSIBILITY** - All work shall be installed by the Contractor so as to be readily accessible for inspection, operation, maintenance and repair. Minor deviations from the arrangement indicated on the Contract Drawings may be made to accomplish this, but they shall not be made without approval by the Commissioner.
- G. **CHANGES IN PIPING, DUCTS, AND EQUIPMENT** - Wherever field conditions are such that for proper execution of the work, reasonable changes in location of piping, ducts and equipment are necessary and required, the Contractor shall make such changes as directed and approved, without extra cost to the City.
- H. **CLEANING OF PIPING, DUCTS, AND EQUIPMENT** - Piping, ducts and equipment shall be thoroughly cleaned by the Contractor of all dirt, cuttings and other foreign substances. Should any pipe, duct or other part of the several systems be obstructed by any foreign matter, the Contractor will be required to pay for disconnecting, cleaning and reconnecting wherever necessary for the purpose of locating and removing obstructions. The Contractor shall pay for repairs to other work damaged in the course of removing obstructions.
- I. **STANDARDIZATION OF SIMILAR EQUIPMENT** - Unless otherwise particularly specified, all equipment of the same kind, type or classification, and used for identical purposes, shall be the product of one (1) manufacturer.
- MACHINERY PARTS** - shall conform exactly to the dimensions shown on the Contract Drawings. The equivalent parts of identical machines shall be identical so that they can be interchangeable.

- K. **FITTINGS** - All grease lubricating fittings on equipment shall be of a uniform type and shall be readily accessible and types proposed to be used shall be submitted for approval.
- L. **GUARDS** - All machinery shall be designed with protecting guards conforming with the requirements of the Industrial Code of the New York State Department of Labor or OSHA, whichever is stricter.
- M. **LIMIT SWITCHES** - Unless otherwise specified, limit switches and other mechanically actuated switches shall be enclosed in tight metal boxes and be installed in the proper locations ready for conduit connections. Switches shall be complete with all supports, stops, cams, arms, tripping and operating members, which shall be adjustable where required for proper functioning.
- N. **ANCHORS, BOLTS, ETC. AND FOUNDATIONS** - Unless otherwise specified, the Contractor shall furnish the necessary anchors, bolts, guides, track rails, bearing plates, substantial templates and all other appurtenances, and build the necessary foundations, as approved by the Commissioner, for all equipment supplied by the Contractor under its Contract.
- O. **EQUIPMENT DESIGN** - Equipment and appurtenances shall be designed in conformity with ASME and AIEE standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operations. Adequate stays, braces and anchors shall be provided. All bearings and moving parts shall be adequately protected against wear by bushings, or other approved means, and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers and the like shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.
- P. **SUPPORTING STRUCTURES DESIGNED BY THE CONTRACTOR** - Unless otherwise specified, supporting structures for equipment to be furnished by the Contractor shall be designed and built by the Contractor of sufficient strength to safely withstand all stresses to which they may be subjected, within permissible deflections, and shall meet the following standards:
1. Structural Steel - ASTM Standard Specifications, AISC and NYBC.
 2. Concrete for supports for equipment shall conform to the Specifications for concrete herein, but in no case shall be less than the requirements of the NYBC for average concrete.
 3. Steel reinforcement for concrete shall be of intermediate grade and shall meet the requirements of the Standard Specifications for Billet Steel-Concrete Reinforcement Bars, ASTM.
- Q. **ENGINEER'S ASSUMED DESIGN DATA** - All structural steel, concrete and reinforcement indicated or specified to support the equipment or appurtenances and the area immediately adjacent thereto have been designed from data based on assumed average anticipated clearances and loading. The final structural design in these locations will be based on definite data received from the Contractor after the Commissioner approves the equipment and appurtenances to be installed. The Commissioner will then redesign, if necessary, the supporting structure to properly support and maintain the approved equipment and appurtenances. Necessary major changes in design will be covered by Supplementary Drawings that will be furnished to the Contractor. All changes indicated or necessary to accommodate the equipment and appurtenances, shall be incorporated into the Working Drawings submitted for approval, and the cost of furnishing and installing the work necessitated by these changes shall be borne by the Contractor furnishing the equipment.
- R. **INSTALLATION OF EQUIPMENT** - Equipment shall be erected in a neat and workmanlike manner on the foundations, at the locations and elevations shown on the Contract Drawings or as required. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between various units and with piping and equipment that may be installed under other Contracts. When required by the Specifications, the Contractor shall obtain the assistance of a competent and experienced Engineer or Superintendent, in the employ of the manufacturer, to install the equipment.

- S. **ELIMINATION OF NOISE** - All work provided under the Contract shall operate without objectionable noise or vibration.
1. Should operation of any one or more of the several systems produce noise or vibration which is, in the opinion of the Commissioner, objectionable, the Contractor shall at its own expense make changes in piping, equipment, etc. and do all work necessary to eliminate objectionable noise or vibration.
 2. Should noise or vibration found objectionable by the Commissioner be transmitted by any pipe or portions of the structure from equipment installed under the Contract, the Contractor shall 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.
- T. **GROUTING** - The Contractor shall furnish all material and labor for proper bedding on Portland Cement grout, the equipment or its supporting base. Grout shall consist of one (1) part Portland Cement and one (1) part of approved sand. The top of the masonry foundation shall be properly cleaned and wetted before grouting. Grout shall completely fill all spaces between the equipment, or base, and the foundation and it shall generally average one (1) inch in thickness. Leveling wedges shall not be removed before the grout has reached its final set. Voids left by wedges shall be pointed with grout. Exposed surfaces of the grout shall have a finished appearance.
- U. **PRELIMINARY FIELD TEST** - As soon as conditions permit, the Contractor shall furnish all necessary labor and materials for, and shall make, preliminary field tests of the equipment to ascertain compliance with the requirements of the Contract. If the preliminary field tests disclose equipment that does not comply with the Contract, the Contractor shall, prior to the acceptance test, make all changes, adjustments and replacements required.
- V. **INSTRUCTIONS ON OPERATION** - At the time the equipment is placed in permanent operation by the City, the Contractor shall make all adjustments and tests required by the Commissioner to prove that such equipment is in proper and satisfactory operating condition. The Contractor shall 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.

1.37 General Electrical Requirements

SCOPE - This Article 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 Article and the requirements of the Specifications and/or the Contract Drawings, whichever requirements is the most stringent, as determined by the Commissioner, shall take precedence.

PART A - PROCEDURE--ELECTRICAL APPROVALS

SCOPE- 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 contracts for other than 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 shall be made to have all apparatus operate normally under these conditions.
- B. **SUPERVISION AND ACCEPTANCE** - The electrical work and equipment shall be installed under the supervision of the Commissioner's representative. Final acceptance and approval of the work will be contingent upon the inspection and test of the installation by the City regulatory agency, on completion.
- C. **TESTS** - The Contractor shall notify the Commissioner when the Contractor will examine and begin

work and shall also notify the Commissioner when the Contractor has completed the work and is ready to have it inspected and tested. Upon completion of the work and prior to final payment, tests shall be made as required by the Commissioner of all electrical materials, electrical and associated mechanical equipment, and of appliances installed hereunder. The Contractor shall furnish all labor and material for such tests. Should the tests show that any of the material, appliances or workmanship are not first class or not in compliance with the Contract, the Contractor on written notice shall remove and promptly replace them with other materials in conformity with the Contract.

D. CERTIFICATE OF THE BUREAU OF ELECTRICAL CONTROL, OF THE DEPARTMENT OF BUILDINGS (B.E.C.) - Before final payment is made, there must be filed with the Department of Design and Construction, a Certificate of Inspection signed by the Director of the B.E.C., which Certificate shall certify that all materials and workmanship comply with the rules and regulations of the B.E.C. of the City of New York and with the Electrical Code of the Administrative Code of the City of New York.

E. RESPONSIBILITY FOR CARE AND PROTECTION OF EQUIPMENT

1. The Contractor furnishing any equipment shall be responsible for the equipment until it has been finally inspected, tested and accepted, in accordance with the requirements of these Specifications.
2. After delivery and before and after installation, the Contractor shall protect all equipment against theft, injury or damage from all causes. The Contractor shall carefully store all equipment received for work, which is not immediately installed. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through a special dielectric test as directed by the Commissioner, at the expense of the Contractor or replaced by the Contractor without additional cost to the City.

F. UNIFORMITY OF EQUIPMENT - Any two (2) or more pieces of apparatus or materials of the same kind, type or classification and being used for identical types of service, shall be made by the same manufacturer.

G. CONTRACTOR'S ELECTRICAL DRAWINGS AND SAMPLES FOR APPROVAL

1. The Contractor shall submit to the Commissioner for approval, 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 shall be included. A letter, in triplicate, shall accompany each submittal.
2. The Contractor shall submit duplicate samples of such materials and appliances as may be requested by the Commissioner for approval. These samples shall 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.

H. TIMELINESS - All material shall be submitted in sufficient time for the program 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.

I. CONTRACTOR'S STATEMENT WITH SUBMITTALS - All dimensional drawings of equipment, blueprints, catalogues, models, samples and other data relative to the equipment, the materials, the work or any part thereof submitted for approval are to be accompanied by a statement that they have been examined by the Contractor and that the drawings, data and other material submitted agree with the requirements of the Contract and Specifications and shall list and describe the points of

disagreements, if any exist. In the absence of such statement, approvals will be given with the understanding that articles of equipment or materials or methods of installation are in substantial compliance with the Contract and that if the adoption of these designs, details, articles, equipment, materials, constructions, installations, places and locations necessitate changes, alterations or replacements at an increased cost to the Contractor or others, the Contractor making the substitution for the specified equipment or material shall bear all such additional expense involved.

- J. **BULLETINS AND INSTRUCTIONS** - The Contractor shall furnish and deliver to the Commissioner, 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 B - TEMPORARY LIGHTING, SITE SECURITY LIGHTING & POWER

SCOPE - This Section sets forth the General Conditions and procedures relating to Temporary Lighting, Site Security Lighting and Power during the construction period, and is applicable to, and binding on, all Contracts insofar as they are affected.

A. TEMPORARY LIGHTING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. Energy for the Temporary Lighting System for minor rehabilitation projects (those projects whose existing distribution system is not being changed or modified under the scope of this project) may be taken from the existing electrical distribution system if the existing system is of adequate capacity for the additional temporary lighting load. The Contractor for Electrical Work is to cooperate and coordinate with the facility custodian so as not to interfere with the normal operation of the facility.
2. Energy for the Temporary Lighting system for new projects and for those existing projects that are not covered in the preceding paragraph shall be provided as in the following paragraphs.
3. **CONNECTION TO UTILITY LINES** - Temporary Electric Service for use during construction shall be provided as follows: The Contractor for Electrical Work shall provide adequate service for the temporary lighting system, or a minimum of 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. The Contractor for Electrical Work shall include in its bid any charges which may be made by the Public Utility Company for extending its electrical facilities, and for making final connections. The Contractor for Electrical Work shall make payment directly to the Public Utility Company.
4. **APPLICATIONS FOR METER** - The Contractor for Electrical Work shall make 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 Lighting. The Contractor for Electrical Work shall pay to the Public Utility Company, all bills for Temporary Lighting energy used throughout the work, as they become due.
5. **SERVICE AND METERING EQUIPMENT** - The Contractor for Electrical Work shall furnish and install, at a suitable location on the site, approved service and metering equipment for the Temporary Lighting System, ready for the installation of the Public Utility Company's metering devices. The temporary service mains to and from the metering location shall be not less than 100 Amperes, 3-phase, 4-wire and shall be of sufficient capacity to take care of all demands for Temporary Lighting and Site Security Lighting and shall meet all requirements of the NYCEC.
6. The Contractor for Electrical Work shall furnish and connect to the metered service point, a system of Temporary Lighting 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 shall be located near entrance on ground floor.

7. ITEMS - The Temporary Lighting System shall 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, trailers 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.
8. The Temporary Lighting System shall be progressively installed as required for the advancement of the work under the various Contracts.
9. RELOCATION - Any 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 Commissioner's field representative, shall bear all costs thereof.
10. TRAILERS - Trailers shall be furnished with left-hand sockets with locked type guards and 40 feet of rubber covered cable. The Contractor for Electrical Work shall furnish and distribute a minimum of three (3) complete trailers to each Contractor. See the detailed Electrical Specifications for possible additional trailers required.
11. LAMPS - The Contractor for Electrical Work shall furnish and install one (1) complete set of lamps, including those for the trailers. Broken and burned out lamps in the general lighting system shall be replaced by the Contractor for Electrical Work while those in the trailers shall be replaced by the Contractor using such equipment. All lamps shall be 100 watt.
12. CIRCUIT PROTECTION - The Contractor for Electrical Work shall furnish and install GFI protection for the Temporary Lighting and Site Security Systems.
13. ENERGIZING - The Contractor for Electrical Work shall 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 completion and final acceptance of the work of the Contractor for Electrical Work or until the services are terminated by instructions from the Commissioner.
14. MAINTENANCE OF TEMPORARY LIGHTS
 - a. The Contractor for Electrical Work shall maintain the Temporary Lighting System in good working order during the scheduled hours established.
 - b. The Contractor for Electrical Work is to include in its contract all charges for energy for the Temporary Lighting System.
 - c. The Contractor is advised to show the estimated cost of the installation, maintenance and energy of temporary electrical facilities in its detailed cost estimate of its Contract so as to facilitate partial payments during construction.
15. OVERTIME USE - Any Contractor requiring Temporary Lighting Service before or after hours set forth hereinbefore, or on weekends or a Holiday for all trades involved in the construction of this facility, shall pay for the additional cost of keeping the system energized and repaired. If more than one (1) Contractor is involved, the charges shall be prorated, or shared by other acceptable means previously agreed upon by the Contractors involved. When overtime is required by all Contractors on the work, the provisions for payment for regular time use of the Temporary Lighting System shall apply.
16. SERVICE BEYOND COMPLETION DATE - When failure to comply with the terms and conditions of any Contract necessitates temporary light beyond the date set for completion of the Contract for Electrical Work, the Contractor requiring such additional service shall pay for keeping it energized. When more than one (1) Contractor requires such service, the expense thereof shall be prorated

as determined by the Commissioner.

17. **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 Contractor for Electrical Work, 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 shall 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.
18. **REMOVAL OF TEMPORARY LIGHTING WIRING** - The temporary lighting system shall be removed by the Contractor for Electrical Work when authorized by the Commissioner.
19. **HAND TOOLS** - The temporary electric lighting system shall not be used for power purposes, excepting that light hand tools not larger than 1/4 horsepower may be operated therefrom by any Contractor.

B. SITE SECURITY LIGHTING (FOR NEW CONSTRUCTION ONLY) (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. The Contractor for the Electric Work shall furnish, install and maintain a system of site security lighting, as herein specified, to illuminate the construction site of the project, and it shall be connected to and energized from the Temporary Lighting System.
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. After the system is installed and in operation, and a part of the system interferes with the work of any trade, that trade shall 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 shall consist of flood lighting by pole mounted guarded sealed-beam units. Floodlight units shall be mounted 16 feet above grade. Floodlights shall 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 shall be installed in a manner acceptable to the Resident Engineer. The first lighting unit in each circuit shall be provided with a photoelectric cell for automatic control. The photoelectric cell shall be installed as per manufacturer's recommendations.
4. All necessary poles shall be furnished and installed by the Contractor for Electrical Work.
5. The site security system shall be kept illuminated at all times during the hours of darkness. The Contractor for Electrical Work, at its own expense, shall keep the system in operation, furnishing and installing all material necessary to replace all damaged or burned out parts.
6. The Contractor for Electrical Work shall be on telephone call alert for maintaining the system during the operating period stated above.
7. All materials and equipment furnished under this section shall remain the property of the Contractor for Electrical Work and shall be removed and disposed of by the Contractor for

Electrical Work upon completion of that phase of the project.

C. TEMPORARY POWER

1. Any Contractor requiring temporary power for equipment larger than 1/4 horsepower shall arrange with the Public Utility for service and pay for all electrical energy consumed by its lines.
2. The Contractor shall provide service, metering equipment and distribution centers as required, and be responsible for keeping the system in working order.
3. When directed by the Commissioner, the Contractor shall remove its own temporary power system.

D. USE OF COMPLETED PORTIONS OF THE ELECTRICAL WORK

1. **USE OF MAIN DISTRIBUTION PANEL** - As soon as the permanent electric service feeders and equipment, metering equipment and main distribution panel are installed and ready for operation, the Contractor for Electrical Work shall have the temporary lighting system changed over from the temporary service points to the main distribution panel.
2. **COST OF CHANGE OVER** - The Contractor for Electrical Work shall be responsible for all cost due to this change over of service and it shall 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 lighting specified herein shall be adhered to after change over of service.
4. **NO EXTRA COST** - The operation of the service and switchboard equipment shall be under the supervision of the Contractor for Electrical Work, but this shall 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 shall be no additional charge for supervision by the Contractor for Electrical Work.

PART C - ELECTRICAL INSTALLATION PROCEDURE

SCOPE - This Section sets forth the general installation procedure that shall apply to all electrical work and electrical equipment appearing in any of the Contracts.

- A. INTENT OF CONTRACT DOCUMENTS** - Contract Specifications and Contract Drawings 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 shall provide whatever labor and materials are found necessary, within the scope of its 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 the Department of Design and Construction. 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 accessibility for repairs, even though this selection is the most costly.
- 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 the Department of Design and Construction during construction.

- C. **SLEEVES** - required for conduits passing through walls or floors, shall be furnished and set by the Contractor installing the conduits. Sleeves in waterproofed floors shall be provided with flashing extending 12 inches in all directions from sleeve and secured to waterproofing. Flashing shall be turned down into space between pipe and sleeve and caulked watertight. Flashing shall be 20 oz. cold rolled copper. Sleeves shall be supplied with welded flanges similar to those supplied by the Contractor for Plumbing Work and shall extend one (1) inch above finished floor.
- D. **COORDINATION** - Each Contractor shall keep in close touch with the construction progress and obtain the necessary information for the accurate placement of its work in ample time 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. **RESPONSIBILITY FOR ERRORS OF INSTALLATION** - In case of interference with the work of others or erroneous placement of work with respect to equipment or structures, each Contractor shall cooperate with other affected Contractors for an immediate agreeable solution of the affected work with each Contractor furnishing its responsible share of the labor and materials necessary to complete the installation in an approved manner.
- F. **RESTORATION** - If drilling or cutting is done on finished surfaces of equipment or the structure, any marring of the surface shall be repaired or replaced by the Contractor who caused the damage. Each Contractor shall 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 shall, at their own expense, restore the waterproofing to the satisfaction of the Commissioner.
- G. **ELECTRICAL WORK AT SITE** - Any Contractor who is required to furnish equipment consisting of a number of related electrical devices or appliances, mounted in a single enclosure, or on a common base, shall furnish this unit complete with internal wiring, connections, terminal boxes with copper connectors and/or lugs and ample electrical leads, ready for connection and operation. The cost of any wiring, re-wiring or other work required to be done on this unit in the field, shall be borne by the Contractor who furnished the unit, without cost to the City.
- H. **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 shall exercise the utmost diligence in cooperating with others to produce a complete, harmonious installation.
- I. **DEFINITIONS**
1. **WIRING** means both wire and raceway (rigid steel, heavy wall conduit unless specifically indicated otherwise).
 2. **POWER WIRING** means wiring from a panelboard 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.
 3. **CONTROL and/or INTERLOCK WIRING** means that 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.
- J. **WORK BY CONTRACTORS FURNISHING ELECTRICAL EQUIPMENT** - Any Contractor who furnishes an electrically operated or motorized unit of equipment shall 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 shall also furnish and install approved foundations for same. Special

foundations, if required, will be described in the detailed Specification.

- a. **MATERIAL** - All foundations, unless required otherwise, shall rest on a structural slab and shall be of poured concrete, of a mixture specified for reinforced concrete. Foundations shall 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 shall be as recommended by the manufacturer of equipment and approved by the Commissioner. The minimum height of foundations above finished floor shall be four (4) inches and foundations shall extend at least six (6) inches at all sides beyond the base plates of equipment.
2. At least one (1) inch of grout shall 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 shall be provided. The Contractor shall 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 shall 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 shall furnish and install a suitable platform, bracket or shelf, whichever is appropriate or specified, and mount the equipment thereon. This support shall be constructed of substantial 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 shall be installed. The Contractor shall apply one (1) coat of approved 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 shall 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 can not 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 shall 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 shall 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 shall be

by that Contractor, including any power required for any control device.

- (2) The Contractor for Heating, Ventilating and Air Conditioning Work shall 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 shall 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 Specific Requirements, the Contractor for Electrical Work shall 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 shall 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 shall be furnished and installed by the Contractor furnishing the boiler/furnace.

K. WORK BY CONTRACTOR FOR ELECTRICAL WORK - The Contractor for Electrical Work shall perform the following work:

1. **PANELETTE** - The Contractor for Electrical Work shall furnish and install a four (4) circuit panelette in each mechanical equipment room.
2. **STARTERS AND DISCONNECT SWITCHES** - The associated disconnect switches and starters approved by the Department of Design and Construction which require mounting or wiring apart from a main equipment unit shall be delivered, prewired, to the Contractor for Electrical Work at the site of the project, who shall install and wire them. The electrical Contractor shall acknowledge acceptance in writing to the Contractor supplying them, and thereafter assume responsibility for their safe keeping until final acceptance of its work by the City.
3. **CONTROL DEVICES** - The Contractor for Electrical Work shall install conduit, wire, and make all connections for all interlock and control devices furnished under the Plumbing Work Contract and also all control and interlock devices furnished under the General Construction Work Contract, except for door control wiring. The various control and interlock devices, furnished (prewired) by the Contractors for Plumbing and General Construction Work Contractors, shall be installed and final connections made by the Contractor for Electrical Work.
4. **DOOR CONTROL WIRING** - Unless specifically detailed otherwise in the Contract Documents for Electrical Work, all door control and interlock devices are to be furnished and installed and wired by the Contractor furnishing the required control and interlock devices.
5. **TESTS** - The Contractor supplying the equipment, together with the Contractor for Electrical Work shall cooperate in making preliminary tests to establish the correctness of the installation. If a faulty operation of the unit is discovered, the Contractor whose work is the cause shall, without delay, remedy the trouble.

L. PAINTING

1. Ingredients and methods of application shall conform to that as required for similar work under the Contract for General Construction Work.
2. **ALL METAL CABINETS** - including switchboards, panelboards, boxes (pull, junction and outlet), trims, doors and covers shall be painted as follows:

All surfaces inside and outside, one (1) approved coat of primer. All accessible surfaces one (1) coat of approved paint inside and outside, in the field after installation.

3. HANGERS, CONDUITS AND FITTINGS - The Contractor who installs them shall give one (1) field applied, approved coat primer, followed by a second coat.
4. FINAL COAT--A final or third coat of paint, as directed, shall be applied by the Contractor installing them when the wall surfaces on which they are supported or the ceiling from which they are hung are not painted by the Contractor for General Construction Work. Pull boxes shall be neatly and legibly stenciled to show service.
5. PAINTING OF MOTORIZED EQUIPMENT - The Contractor furnishing electrically driven equipment shall paint motors and driven equipment, starters and controllers and other equipment provided by the Contractor. The Contractor shall provide any painting or finishing that may be required in the Specifications. For certain equipment having special corrosion resistant factory finishes, painting may be waived by special permission. Equipment shall be neatly stenciled, with legible characters to indicate service by the Contractor who supplies the equipment.
6. NAME PLATES - shall be left clean of all paint.

PART D - ELECTRICAL CONDUIT SYSTEM INCLUDING BOXES (PULL, JUNCTION AND OUTLET) - (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the requirements applying to any Contract requiring the installation of electrical conduits, boxes or fittings. Rigid steel conduit shall be used through out, unless specifically indicated otherwise. TYPES-where the word 'conduit', without a modifier such as, rigid steel, EMT, etc., is specified to be used, it shall be interpreted to mean, rigid steel, heavy wall, threaded conduit.

A. CONDUIT TYPES

1. RIGID STEEL CONDUIT - shall be interpreted to mean rigid steel, heavy wall conduit that is hot dipped galvanized inside and outside. The conduit shall 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 shall be used for all exposed work, for all underground conduits in contact with earth and for fire alarms systems as required by the Building Code. Rigid steel conduit shall be used for all underground conduits in contact with earth, for Fire Alarm Systems and as required by authorities having jurisdiction.
2. ELECTRICAL METALLIC TUBING (EMT) - shall be industry standard thin wall conduit of galvanized steel only. All elbows, bends, couplings and similar fittings which constitute a part of the conduit system shall be specifically designed for use with electric metallic tubing. Couplings and terminating fittings shall be of the pressure type as approved by the Commissioner. Set screw fittings will not be acceptable. EMT shall 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.
3. FLEXIBLE METALLIC - 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 shall 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.

B. INSTALLATIONS AND APPLICATIONS

1. Unless otherwise specified or indicated on the Contract Drawings, conduit runs shall be installed

concealed in finished spaces.

2. **CONDUIT SIZES** - The sizes of conduit shall be as indicated on the Contract Drawings. Wherever conduit sizes are not indicated, the conduit shall meet the requirements of the NYCEC to accommodate the conductors to be installed therein.
3. Conduits shall be reamed smooth after cutting. No running threads will be permitted. Universal type couplings shall be used where required. Conduit joints shall be screwed up to butt. Empty conduits after installation shall have all open ends temporarily plugged to prevent the entrance of water or other foreign matter.
4. Conduits being installed in concrete or masonry shall be securely held in place by the Contractor installing them during pouring and construction operations. A group of conduits terminating together shall be held in place by a template.
5. **UNDERGROUND STEEL CONDUITS** - Unless otherwise specified, all underground steel conduits in contact with earth shall 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 shall 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 shall 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 shall 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 shall secure and pay for all necessary permits and inspection fees and pay the cost of repaving.
7. **EXPOSED CONDUIT SUPPORTS** - Exposed conduit shall be supported by zinc coated hangers with necessary inserts, beam clamps of approved design or attached to walls or ceilings by expansion bolts. Exposed conduits shall be supported or fastened at intervals not more than five (5) feet.
8. Exposed conduit shall be installed parallel or at right angles to ceiling, walls and partitions. Where direction changes of exposed conduit cannot be made with neat bends, such as required around beams or columns, conduit type fitting shall be used.
9. The conduit shall be installed with an approved expansion joint:
 - a. Wherever the conduit crosses a building expansion joint (each Contractor will be held responsible for determining where the building expansion joints are located).
 - b. Every 200 feet, when in straight runs of 200 feet or longer.
10. Conduit may only enter and leave a floating slab in the vertical direction, and then only in an approved manner. Horizontal entries into floating slabs are not permitted.
11. Conduit installed in pipe shafts shall 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 shall be provided to assure stability of the raceway system.
12. **BUSHINGS AND LOCKNUTS** - Approved bushings and locknuts shall be used wherever conduits enter outlet boxes, switch boxes, pull boxes, panel board cabinets, etc. For conduits one (1) inch in diameter or larger, insulating bushings to be O.Z. or approved equal.
13. **CONDUIT BENDS** - shall be made without kinking conduit or appreciably reducing the internal diameter. All bends in conduit of two (2) inch in diameter or larger shall be made with an hydraulic or power pipe bender. The radius of the inner edge of any bend shall 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 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 shall 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 shall be of lignum vitae turned to approximately 85% of the internal diameter of the raceway to be tested. Two (2) short wire brushes shall be included in the mandrel assembly. Snaking of conduits, ducts, etc., shall be performed by the Contractor in the presence of the Electrical Inspector. Any conduits or ducts which reject the mandrel shall 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 shall be assigned to the various conduit runs, and as they test clear they shall 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 shall be tagged.
- c. TEST RECORDS - As the conduit runs clear, a record shall 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 shall be signed by the Electrical Inspector and submitted in triplicate for approval. This record shall be entered on the Record drawings, which are required under "General Conditions Governing All Contracts."
- d. CAPPING - All empty conduit and duct openings, after test, shall be capped or plugged by the Contractor as directed.
- e. DRAG LINES - A drag line shall be left in all empty conduit.

C. BOXES

1. The Contractor shall furnish and erect all pull boxes indicated on the plans or where required. Sides, top and bottom of pull boxes shall be zinc coated and shall 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 shall be removable and held in place by corrosion resistant machine screws. Pull boxes in damp locations shall have threaded hubs and gaskets. All pull boxes shall be suspended from ceiling or walls in the most substantial manner.
2. For large boxes, sufficient suitable porcelain clamp insulators or other approved devices shall be provided in the pull boxes for supporting the cables passing through the box so that the cables will not be unsupported for a distance greater than three (3) feet and so as to permit a neat and orderly arrangement of the cables.
3. For pull boxes having the largest side more than nine (9) square feet in area, special rectangular and diagonal angle-iron bracing will be required as approved.
4. Pull boxes of special or odd shapes are required to be installed by the Contractor, even though not shown on plans, where necessary to overcome interference or to facilitate the pulling of conductors in conduits.
5. In centering outlets, the Contractor is cautioned to allow for overhead pipes, ducts and other obstructions, and for variations in arrangement and thickness of fireproofing, soundproofing and plastering. Precautions should be exercised regarding the location of window and door trims,

paneling, etc. Mistakes resulting from failure to observe these precautions, must be corrected by the Contractor without cost to the City. Outlets in hung ceilings shall be supported from the black iron or structure.

6. The exact location of all outlets in finished rooms shall be as directed. When the interior finish has been applied, the Contractor shall make any necessary adjustment of its work to properly center the outlets. All outlet boxes for local switches near doors shall be located at the strike side of doors as finally hung, whether so indicated on the drawings or not.
7. Exposed wall outlet boxes shall be erected neatly and tight against the walls and securely anchored to same.
8. All wall outlets of each type shall be set accurately at the same level on each floor, except where otherwise specified or directed. Where special conditions occur, outlets shall be located as directed.
9. 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
 - 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
10. Outlet boxes shall be of approved design and construction; of form and dimensions suited and adapted to its specific location; the kind of fixture to be used and the number and arrangements of conduits, etc., connecting therewith. All ferrous outlet boxes shall meet the requirements for zinc coating as specified under Electrical Conduit Systems.
11. There shall be knockouts opened only for the insertion of conduit. Any outlet boxes with more openings than are necessary for conduit insertion, shall be sealed by the Contractor without additional charge.
12. All outlet boxes and junction boxes for exposed work shall be galvanized cast iron or cast aluminum with threaded openings. Outlet boxes for exposed inside work in damp locations shall be galvanized cast iron or cast aluminum with threaded hubs and neoprene gaskets.
13. Junction boxes shall not be less than 4 11/16" square and shall be equipped with zinc coated plates. Where plates are exposed they shall be finished to match the room decor.
14. FIXTURE SUPPORTS - Outlet boxes supporting lighting fixtures shall be equipped with fixture studs held by approved galvanized stove bolts or integral with the box. Cast iron or malleable boxes shall have four (4) tapped holes for mounting required cover or fixtures.
15. Outlet boxes exposed to the weather or indicated W.P., shall be cast iron or cast aluminum and the covers made watertight with neoprene gaskets. The boxes shall have external lugs for mounting. Drilling of the body of the fitting for mounting will not be permitted. The cover screws shall be appropriate in size, noncorrodible and not less than four (4) in number for each box opening.

PART E - ELECTRICAL WIRING DEVICES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. WALL SWITCHES shall be of the best specification grade, quiet type, and shall have a rating of 20 Amperes at 277 volts, as manufactured by Bryant, Hubbell or approved equal. The mechanism shall be equipped with arc snuffers. They shall be of the tumbler type, single pole. Switches of the 3-way type shall have a similar rating.
- B. RECEPTACLES
1. CONVENIENCE OUTLETS - shall be of the best specification grade, duplex, two-pole, 3-wire, 15 Amperes at 125 volts. It shall have a grounding pole that shall be grounded to the conduit system. Receptacles shall be capable of both back and side wiring and shall have only one (1) grounding screw. Receptacles shall be Hubbell Cat. #5262 or approved equal.
 2. HEAVY DUTY RECEPTACLE OUTLETS - shall have the Ampere rating and the number of poles specified on the Contract Drawings and shall be Hubbell, Russell-Stoll, Bryant, AH & H or approved equal. Each outlet shall have a grounding pole, which shall be grounded to the conduit system.
 3. FLOOR RECEPTACLES - shall 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 shall 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 shall be in a gasketed, cast iron enclosure.
- E. PLATES
1. Every convenience outlet and switch outlet shall 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 shall be used. Where more than three (3) switches are located at one (1) point, the faceplates may be made up in multiple units.

PART F - ELECTRICAL CONDUCTORS AND TERMINATIONS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. CONDUCTORS FOR LIGHT AND POWER - All wire and cable shall be of annealed copper of 98% conductivity. Aluminum wire or cable will not be permitted. The insulation shall be flame retardant, moisture and heat resistant, thermoplastic, type THW or THWN rated for 600 volts at 75 degrees C. for both wet and dry locations. Wires No. 8 or larger shall be stranded. Wires and cables shall also be subject to the requirements of the NYCEC. Cables for incoming service or wire in conduits contiguous with the earth or in concrete or other damp or wet locations shall be synthetic rubber insulated with neoprene jacket, heat and moisture resistant and shall 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 shall 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 detailed

Specifications of applicable Contracts.

- D. MINIMUM SIZE - Conductors smaller than No. 12 AWG shall not be used for light or power.
- E. COLOR CODE - Wires shall have a phase color code, and multiple conductor cables shall be color coded.
- F. CABLE DATA - The Contractor shall 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 shall be delivered to the site of the work on original sealed factory reels.
- H. TESTS
 - 1. NOTIFICATION OF TEST - No cable shall be released for shipment from the mill unless authorized by the Commissioner. The Contractor shall give the Commissioner at least 10 days notice when the cable will be available for testing at the mill. The Contractor's representative or inspector shall have access during working hours to all parts of the plant where the cable is being manufactured, and all reasonable inspection and testing facilities shall be afforded to the Contractor without increase in price to the City. The Inspector shall witness the complete test of cable and receive a copy of all test data.
 - 2. TEST DATA - The Contractor shall forward to the Commissioner six (6) copies of all test data for approval before accepting shipment of the cable.
 - 3. INSPECTION DURING MANUFACTURE - The Commissioner reserves the right to dispatch a representative to the factory at any time during the period of manufacture of the cable for the purpose of expediting or checking progress. The living and traveling expenses of the City Engineers making these inspections and witness tests will be borne by the City of New York.
 - 4. TEST IN CITY LABORATORY - Sufficient additional length of conductor shall be provided on each reel, so that a six (6) foot sample may be removed for testing in the City's Laboratories. This sample shall be cut from the reel in the presence of the Inspector of the Department of Design and Construction and cut in two (2) three-foot lengths, each piece to be tagged showing reel number, size and type, manufacture, date, name or project & Contract number. Samples shall be handed to the Inspector for transmittal. If it is found as the result of test that the cable does not comply with the approved factory test the Contractor will be ordered to remove all cable which came off the reel and has been installed, and to replace the defective cable not used, without cost to the City. The Contractor will be held responsible for any delays in the construction program caused by the defective cable.
 - 5. FINAL FIELD TEST - After conductors are installed and connected, the City will test the work for overall insulation resistance. The Contractor shall furnish all test equipment necessary. To be acceptable, the test shall meet the requirements set forth in the NYCEC.
- I. WIRE INSTALLATION
 - 1. INSTALL WIRES AFTER PLASTERING - Feeder and branch circuits wiring shall not be installed in conduit before the rough plastering work is completed. No conductors shall be pulled into floor conduits before floor is poured.

2. CONDUIT SECURED IN PLACE - No conductor shall 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 shall be left with sufficiently long ends for proper connection and stowing.
 4. PULLING COMPOUNDS - When required to ease the pulling-in of wires into conduit, only approved compounds as recommended by cable manufacturers shall be used.
 5. PRESSURE CONNECTORS - for wires shall be of the cast copper or forged copper pressure plate type. Connectors shall be O.Z., Burndy, National Electric Products or approved equal.
 6. Splices and feeder taps in the gutters of panel boxes shall 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, shall 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 shall be as approved by the connector manufacturer.
 - b. For wire and cable No. 6 AWG and larger for branch circuit wiring the seamless tubular connector will only be accepted. Application of this connector shall be with a tool recommended by the connector manufacturer.
 9. TAGS - All feeders and risers shall be tagged at both ends, and in all pull and junction boxes and gutter spaces through which they pass. Such tags shall be of fiber and have the feeder designation and size stamped thereon.
10. BRANCH CIRCUIT WIRING
- a. The Contractor installing branch circuit wiring shall test the work for correct connections and leave all loop splices in the fixture outlet boxes properly spliced and taped. The Contractor shall provide wire ends long enough for convenient connection to device.
 - b. NEUTRALS - No common neutrals shall be used except for lighting branch circuits. Each neutral wire shall be terminated separately on a neutral busbar in the panelboard. No common neutrals will be permitted for convenience receptacle branch circuits.

J. TERMINATIONS

1. LUGS - All lugs for all devices and all cable terminations shall 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 manufacture. Lugs for No. 6 AWG cable and larger shall be cast copper or forged copper pressure plate type. Lugs for 1/0 and larger shall be fastened with two (2) bolts.
2. All lugs shall 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 insure 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 Contractor for Electrical Work 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.

PART G - CIRCUIT PROTECTIVE DEVICES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the circuit protective devices such as circuit breakers and safety switches, used in connection with Motor Control Equipment, Distribution Centers, Panelboards and Service Entrance.

A. CIRCUIT BREAKERS

1. CIRCUIT BREAKERS shall be operable in any position and shall be of the quick-make, quick-break type on manual operation. The handle shall 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 shall be provided, in addition to the "On" and "Off" indication. All circuit breakers shall be of the bolted type.
2. TRIP RATING - Circuit breakers shall 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 BARRIERS - Multipole pole breakers shall be designed to break all poles simultaneously. They shall be provided with barriers between poles and arc suppressing devices.
4. ELEMENTS - Multipole circuit breakers shall have frames of not less than a 100 Ampere rating. Multipole circuit breakers for 480 volts AC operation shall have an NEMA interrupting rating of 18,000 Amperes, unless a higher rating is specified in the Specific Requirements 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 shall be provided with interchangeable trip elements, which can be replaced readily.
6. The trip rating of all circuit breakers shall not exceed 70% of frame rating.
7. Single pole circuit breakers for branch circuits shall have a frame size of no less than 100 Amperes, and shall be rated at 125 volt A.C. with a NEMA interrupting rating of 10,000 Amperes, unless a higher rating is specified in the Specific Requirements or indicated on the Contract Drawings.
8. INVERSE TIME ACTION - The circuit breakers shall 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, the other with instantaneous trip action. Inverse time delay action shall 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.
9. CONSTANCY OF CALIBRATION - The tripping elements shall insure constant calibration and be capable of withstanding excessive short circuit conditions without injury.
10. CONTACTS shall be non-welding under operating conditions and of the silver to silver type.
11. TEMPERATURE RISE - Current carrying parts, except thermal elements shall not rise in temperature in excess of 30 degrees C. while carrying rated current at rated frequency.
12. NUMBERING - Each circuit breaker shall be distinctly numbered when installed in a group with other breakers. The calibration of trip element shall 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 shall be of the type HD of a rating not less than 30 Amperes. Enclosures shall be provided with means for locking. For ratings above 60 Amperes terminals shall have double studs.

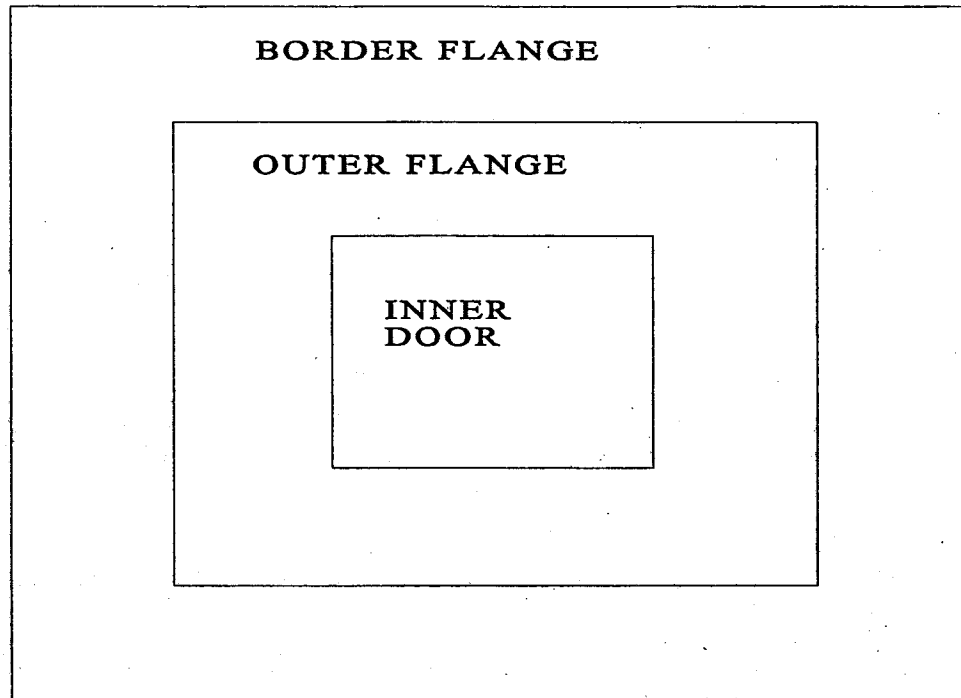
PART H - DISTRIBUTION CENTERS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the construction and installation procedure for Switchboards, Panelboards and Cabinets.

- A. PANELBOARDS--GENERAL TYPE** - The panelboards shall be of the automatic circuit breaker type with individual breakers for each circuit, removable without disturbing the other units. Circuit breakers shall be in accordance with the requirements outlined under "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 shall be distinctly numbered.
- C. BUS-BAR CONSTRUCTION AND SUPPORT** - Panel Boards shall be of the deadfront type and shall have bus bars and branch circuits designed to suit the system and voltage. Current carrying parts, exclusive of circuit breakers shall be copper and based on a maximum density of 1,000 Amperes per square inch. Bus bars for the main switchboard shall be designed for the frame rating of the Service Breaker. Bus bars shall run up the center of the panel, unless otherwise indicated, and shall have connected thereto the various branch circuits. Unless otherwise specified, bus bars for each panelboard shall be equipped with main lugs only and capacity as required on Contract Drawings. Where main protection is required, automatic circuit breakers shall be used. A neutral bus of at least the same capacity as a live bus bar shall be provided for the connection of all neutral conductors. Each terminal shall be identified. All current carrying parts, exclusive of circuit breakers, shall be of copper with a minimum number of joints. The bus bar structure shall be a self supporting unit, firmly fastened to a 1/2 inch plastic board, extending the full length and width of assembly which shall 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 shall separate neutral bus from other parts of panel.
- D. CIRCUIT BREAKER ASSEMBLY** - The entire circuit breaker and bus bar assembly shall be mounted on an adjustable metal base or pan and secured to the back of panel box. The panel shall have edges flanged for rigidity.
- E. PANEL MOUNTING** - The panel shall be centered in the panel box to line up with door openings and set level and plumb so that no live parts are exposed with the door open.
- F. PANEL CABINET CONSTRUCTION AND SUPPORT**
1. Panel boxes shall be fabricated from No. 12 USSG sheet steel of no more than three-piece construction, reinforced at the corners and with continuous welds. Boxes having a back whose area is larger than 16 square feet, shall be of No. 10 USSG sheet steel and reinforced to provide ample stiffness and to prevent buckling. Boxes shall be of sufficient size to afford a clear gutter space on all sides, of not less than six (6) inches.
 2. **PANEL CABINET INSTALLATION** - When installed surface, or in panel closets, they shall be mounted on Kindorf channel, supported from floor slab to ceiling slab.
 3. Where cabinets cannot be set entirely flush due to shallow walls or partitions or where cabinet is extra deep, the protruding sides of cabinet shall 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. CABINET TRIM - Trim for both lighting and power panelboards shall be door-in-door type installation as depicted in DETAIL A TRIM FOR LIGHTING AND POWER PANELBOARDS. Construction details are to be as described in the following paragraphs.



DETAIL A TRIM FOR LIGHTING AND POWER PANELBOARD

1. CABINET TRIM - The trim and doors for lighting and power panels shall be made of No. 12 USSG full finish sheet steel in one (1) piece. Cabinet trim larger than 16 square feet shall be made of No. 10 USSG. The inner door shall cover the circuit breaker section only and be provided with appropriate brass hinges. The outer door shall cover the entire gutter space and shall be attached to the border type flange with appropriate hinges. Both doors for power panels shall be provided with a New York City Lock No. 511S, with key change to No. 47 and two (2) keys. For lighting panels, the inner door shall be provided with a substantial catch. All hinges shall be of the concealed type. Locks shall be flush with trim. In addition, for panels requiring doors over 48 inches in height, furnish a vault handle and a 3-point catch arranged to fasten door at top, bottom and center.
2. The door shall close against a flange or rabbet to afford a dust tight fit. All space between the panel and the cabinet trim shall be closed by means of a sectional plate secured to the trim.
3. The border flange of the trim shall be fastened to the box with oval head screws finished to prevent corrosion or with approved trim clamps.
4. To facilitate installation of trim, a suitable angle iron shall be spot welded across the bottom of each trim to carry the weight of the trim while the holding screws are being put in place.

H. MOTOR CONTROL CENTERS - Motor centers shall be furnished by the Contractor as indicated in the Specifications or Contract Drawings, but shall be installed by the Contractor for Electrical Work.

I. NAMEPLATES - Nameplates where required, shall be made of engraved Lamicoid sheet, or approved

equal. Letters and numbers shall be engraved white on a black background (except for Firehouse projects which shall have white letters on a red background) the Contractor shall submit an engraved sample for approval as to design and style of lettering before proceeding with the manufacture of the nameplate. Nameplates shall be of suitable size and shall 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 shall also be provided for each distribution circuit breaker giving the breaker number, the number of the feeder, and the name of the equipment fed.

- J. SHOP DRAWINGS - showing all details of boxes, panels, etc., shall be submitted for approval.
- K. DIRECTORIES - A directory shall 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 or approved equal that is not less than 1/16 inch thick over cardboard or heavy paper. The directory shall be typewritten and show the number of each circuit, the name of circuit and lighting or equipment supplied. The size of riser feeder shall be as indicated on directory. The dimensions of directory shall be submitted for approval for each size of panel.
- L. CONSTRUCTION
 - 1. FINISH - Panel boxes, doors and trim for installation in dry locations, shall be zinc coated after fabrication by the hot-dip galvanizing or electroplate process on inside and outside surfaces. In damp locations, panelboards shall be enclosed and gasketed NEMA 3R type. Panelboards located outdoors or exposed to the weather shall be cast iron.
 - 2. PAINTING - Panel boxes, doors and trim shall receive a coat of approved priming paint and a second coat of approved paint in the field after installation. Paint shall be applied to the inside and outside of boxes and on both sides of trim. Panel trims and doors shall 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 shall be included in the work of the Contractor who has the Contract for general interior painting.

PART I - MOTORS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the general design, construction and performance requirements, which shall apply to all motors furnished in any of the Contracts.

- A. MOTOR DESIGN - All motors shall be designed to comply with the New York State Energy Code currently in effect. Motors shall have standard NEMA frames and shall have nameplate ratings adequate to meet the specified conditions of operation. Motor performance under variable conditions of voltage and frequency shall be within the limits set in NEMA standards, unless modified in present Specifications. Motors shall be expressly designed for the hazard duty load, voltage and frequency as specified in the Contract. All motor windings shall be copper. All motors intended to operate on a 208 volt system shall be designed and rated for 200 volts.
- B. MOTORS OF SAME MANUFACTURER - Unless expressly permitted otherwise by the Commissioner, all motors under the same Contract shall be manufactured by the same company. Exceptions may be granted in the case of motors of 1/4 horsepower rating and smaller, or for a motor that is an integral part of the equipment, with its housing especially built for this purpose.
- C. STANDARDS OF COMPARISON - In general, the best standard products of the leading motor manufacturers shall be considered as a standard for comparison. The requirements of the NEMA standards for motors and generators shall be deemed to contain the minimum requirements of performance and design.
- D. 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 Building Code of the City of New York may be performed as directed by the Commissioner. Such motors shall bear a nameplate lettered "Quiet Motor." Springs and slip rings shall be of approved non-ferrous material.

E. BEARINGS

1. Bearings, unless specified otherwise, shall be of the ball or roller type. Motors one (1) horsepower and larger that are equipped with ball roller bearings shall also have lubrication of the pressure-relief greasing type. Each Contractor who furnishes four (4) or more such motors shall also furnish, as part of its Contract, a pressure grease gun of rugged design, of approximately 10 ounce capacity, complete with necessary adapters. The Contractor shall also provide 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 shall in addition to having protected accessible fittings for oiling be provided with visible means for determining normal oil level. Lubrication shall be positive, automatic and continuous.

F. MOTOR TERMINALS AND BOXES - Each motor shall 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 shall be furnished of ample size to make and house motor connections. These requirements shall be met irrespective of any other standards or practices. Size of cable terminals and conduit terminal box holes shall be subject to approval. For motors five (5) horsepower or larger, each terminal shall 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 shall be of cast iron with threaded hubs and gasketed covers. Cover screws shall be of non-corrosive material.

G. MOTOR TEMPERATURE RISES - The motor nameplate temperature rises for the various types of motor enclosures shall 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 shall meet the requirements of NEMA standards for the size and type of the motors. Tests for heating shall 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.

H. SPECIAL CODE INSTALLATIONS - Electrical installations covered by special publications of NBFU and by special City rulings and regulations shall comply in design and safety features with such applicable codes, regulations and rulings, and shall be furnished and installed complete with all accessories and safety devices as therein specified.

I. MOTORS ON LIGHTING PANELS - The largest A.C. motor permitted on branch circuits of lighting panels shall not exceed 1/4 horsepower.

J. MOTORS RATED 1/2 horsepower and larger shall be polyphase.

K. TESTS

1. **FACTORY INSPECTION** - Electrical equipment and devices (except portable) not covered by standard Specifications or tests herein prescribed shall be inspected and witnessed on test at the factory with the tested equipment being completely assembled and connected under conditions approved by the Commissioner as equivalent to the actual working conditions. Suitability and

ruggedness of the design for the specified purpose will be a condition for acceptance.

2. **SHOP TESTS** - to determine the load performance of motors shall be made in accordance with Standard C-50, of the ASA. Motors shall meet the requirements of C-50 for insulation resistance, dielectric strength, efficiency and temperature rise. Efficiency (and power factor for A.C. motors) shall be established for 50, 75 and 100 percent of rated horsepower but for motors of 100 horsepower or larger, the 125 percent loading shall be included.
 3. **TEST REPORTS** - The result of shop tests shall be submitted to the Commissioner for approval and shall be on forms approved by the City. The evaluated test data shall include a signed statement confirming the fact that the equipment meets the requirements of the standards of performance.
 4. **MANNER OF TEST** - For motors of 100 horsepower or smaller, check tests against complete tests of similar motors will be accepted. For motors larger than 100 horsepower, complete tests for each motor furnished shall be made, and certified test data sheets shall be submitted for approval, unless shop tests are required by the Detailed Specifications.
 5. **PREFERRED METHODS** - The efficiency of fractional horsepower motors shall be determined by the input-output method; for larger motors up to and including 100 horsepower, the separate loss method as specified in ASA Standards C-50 will be accepted unless otherwise required in the Specifications.
- L. **SPARE PARTS** - The Contractor who furnishes motors, including fractional horsepower, shall provide the following spare parts and accessories in connection therewith:
1. **BRUSHES** - One (1) additional set of brushes for each motor equipped with them.
 2. **BEARINGS** - For each group of three (3) and fraction thereof, of each type and size of motor, the Contractor shall furnish one (1) set of extra bearing linings or ball or roller bearings. Where less than three (3) of any type of motor is involved, one (1) set of extra bearings shall be furnished.
 3. **SPRINGS** - One (1) set of brush springs used in slip ring motor or universal type motors.
 4. **WRAPPER MARKING** - All parts shall be delivered neatly and securely wrapped and boxed, plainly tagged and marked for identification and reordering.

PART J - MOTOR CONTROL EQUIPMENT (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the requirements for motor controllers and associated devices, which are applicable to all Contracts under which motor control equipment is furnished or installed.

- A. **MANUFACTURER** - All control equipment furnished under one (1) Contract shall 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 who furnishes a motor shall 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 breaker, magnetic starter 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 shall furnish as many of these items as are 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 shall 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 30 horsepower shall have magnetic across the line starters; motors rated above 30 horsepower shall be furnished with reduced voltage (autotransformer type) starter or part winding start with time delay to reduce inrush current. Size of starters shall be based on 200V. operation.
2. SLIP RING - A.C. Motors of the slip-ring type shall be furnished with primary across the line starters interlocked with secondary starting and regulating equipment. The interlocking feature shall 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 $\frac{1}{2}$ horsepower or more, magnetic starters and circuit breakers shall be used. Single phase A.C. motors smaller than $\frac{1}{2}$ horsepower or three-phase A.C. motors smaller than one (1) horsepower where manual control is specified may be furnished with starters of toggle switch or push button type with inbuilt thermal protection. No additional disconnecting means is required to be furnished with this type of starter. This type of starter may also be used in series with automatic control devices such as thermostats, float and pressure switches, provided the individual motor or the sum of fractional horsepower motors is less than $\frac{1}{2}$ horsepower. Means for manual operation shall be provided.

D. DISCONNECTING BREAKER - All motor starters, unless otherwise specified shall be provided with a disconnecting means in the form of a circuit breaker of the type specified under "CIRCUIT PROTECTIVE DEVICES" of the General Conditions. This disconnecting means shall be contained in the same housing with the starter and shall be operable from outside. Means shall 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 shall 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 shall be provided.

G. 1. PANELS - Motor control devices and appliances shall be mounted on approved insulating slabs with all wiring and connections made on the back of the slabs.

2. WIRING AND TERMINALS - Wiring connections for currents of 100 Amperes or less may be made with copper wire or cable with special flameproof insulating coverings. Such wires shall be installed in a neat workmanlike manner, flat against the slab, and held in place by clips. Connections shall 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 shall 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.

3. COPPER BUS - For currents exceeding 100 Amperes, copper bus shall be used in place of wires. The bus shall 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 shall provide sufficient areas to keep current density at not more than 1,000 Amperes per square inch.

H. COOPERATION - The Contractors who furnish electrically operated equipment shall give to the Contractor for Electrical Work full information relative to sizes and locations of apparatus furnished by them which require electrical connections.

Equipment being installed by the Contractor for Electrical Work shall be delivered to the Contractor for Electrical Work by other Contractors in proper time and sequence so that the Contractor for Electrical Work shall be able to meet the Contractor for Electrical Work working schedule.

I. SPARE PARTS

1. FURNISH - Each Contractor shall furnish the following spare parts pertaining to equipment furnished by each Contractor.

One (1) set of contact fingers and springs and thermal elements for each three (3) (or fraction) of each size of magnetic contactor starter.

One (1) holding coil for each three (3) (or fraction) of each size of magnetic contactor starter.

2. WRAPPER MARKING - All parts shall be delivered to the Resident Engineer neatly wrapped and boxed and plainly tagged and marked for identification and reordering.

PART K - SCHEDULE OF ELECTRICAL EQUIPMENT

Schedule D requirements for electrical motor equipment 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. SCHEDULE D is included in the Addendum to the General Conditions. In the event of any conflict between the Specifications and 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.

1.38 Safety

- A. Each Contractor shall provide and maintain all necessary temporary closures, guard rails, and barricades to adequately protect all workers and the public from possible injury. Any Contractor requiring removal of these items shall be responsible for the replacement of same.

1.39 Interruption of Services and of Project Facilities

- A. EVENING AND WEEKEND WORK - Where the work makes temporary shutdowns of the services unavoidable, they shall be made at night or on weekends or at such times that will cause no interferences with the established routines and operations of the projects in question.

1. Where weekend or evening work is required due to unavoidable service shutdowns, such work shall be performed at no extra cost to the City.

B. INTERRUPTION OF PROJECT FACILITIES

1. The Contractor shall not interrupt any of the services of the project nor interfere with these in any way without the permission of the Commissioner. Such interruption, or interferences, shall be made as brief as possible, and only at such time stated.
2. Under no circumstances will the Contractor, or its workers, be permitted to use any part of the project as a shop, without the permission of the Commissioner.
3. Unnecessary noise shall be avoided at all times and necessary noise shall be reduced to a minimum.
4. The facility operates 24 hours per day seven (7) days a week. Toilet facilities, water and electricity

must be operational at all times. No services of the project 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.

5. Contractors shall schedule their work to avoid noise interference that will affect the normal functions of the project. In particular, construction operations producing noises that are objectionable to the project functions will be scheduled at times of day or night, day of the week, or weekend, which will not interfere with the project personnel. Any additional cost resulting from this scheduling shall be borne by the specific Contractor.
6. The Contractor shall arrange to work continuously, including overtime, if required, to assure that services will be shut down only during the time actually required to make the necessary connections to the existing work.
7. The Contractor shall give ample written notice in advance to the Commissioner and project personnel of any required shutdown.

1.40 Separation of Work Between Trades (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- 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 to the General Conditions. The delineation set forth in 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 as set forth in Paragraph B below. In the event of any conflict between the Specifications, the General Conditions and 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.
- B. SUPERVISION AND COORDINATION - Each Contractor is required to supply all necessary supervision and coordination information to any other trades who are to supply work to accommodate their installations.

1.41 Shop Drawing and Material Samples Schedule

- A. SCHEDULE F – Schedule F sets forth all submittal requirements for shop drawings and material samples. Schedule F is included in the Addendum to the General Conditions. At the kick-off meeting, each Contractor must review this Schedule with the Commissioner's Representative and the Consultant. Within 10 days after the kick-off meeting, the Contractor must complete information on Schedule F concerning the submission date, the required delivery date and the fabrication time. For all required submittals of shop drawings and material samples, the Schedule F provided by the Contractor must indicate a submission date which is at least 20 days prior to the date of the manufacture of the item or materials to be installed. In addition, if so directed by the Commissioner, the Schedule F provided by the Contractor must indicate a submission date for shop drawings and/or material samples of specified items or materials which is within 60 days after the kick-off meeting. In the event of any conflict between the Specifications and Schedule F, Schedule F shall take precedence; provided, however, in the event of an omission from Schedule F (i.e., Schedule F omits either a reference to or information concerning a submittal requirement which is set forth in the Specifications), such omission from Schedule F shall have no effect and the Contractor's submittal obligation, as set forth in the Specifications, shall remain in full force and effect.
- B. COORDINATION - The Resident Engineer for this project will coordinate and review the data submitted by various Contractors. Upon acceptance by the Resident Engineer, the Resident Engineer

will date and sign the schedule as approved and transmit it to the Consultant, Contractors and Project Manager within the Department of Design and Construction.

- C. ARTICLE 11 - Thereafter, this schedule will be subject to the provisions of Article 11 of the agreement and must be strictly adhered to by the Contractor.

1.42 Specific Requirements

- A. The work of this article shall be the responsibility of the Contractor for General Construction Work, unless otherwise indicated.

B. FIELD MEASUREMENTS

1. Each Contractor shall verify all dimensions and conditions on the job so that all work will properly join the existing work.
2. Each Contractor, before commencing work, shall examine all adjoining work on which each Contractor's work is in any way dependent on good workmanship in accordance to the intent of the Specification and Contract Drawings. The Contractor shall report to the Commissioner any condition that will prevent any Contractor from performing work that is below the required standard.

C. BORINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. 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:
2. 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 forces of the Department of Design and Construction at the site.
3. SOIL 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.
4. CERTIFICATION OF SAMPLES - The City certifies that the work was carried out as stated, and that the soil samples and rock cores, if any were referred to, were actually taken from the site at the times, places and in the manner indicated. The samples are available for inspection in the Department of Design and Construction Subsurface Exploration Section.
5. 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.
6. 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 and the bidder is required to estimate the influence of such features from its own inspection of the site.

D. DEFERRED CONSTRUCTION

1. Where necessity for deferred construction is certified by the Commissioner, in order to permit the installation of any item or items of equipment required to be furnished and installed under any other Contract in effect concurrent with the time allowed for doing and completing the work of the Contract, the Contractor shall defer construction work limited to adequate areas as approved by

the Commissioner.

2. The Contractor shall confer with the affected Contractors and ascertain arrangements, time and facilities necessary to be made by the Contractor in order to execute the provisions specified herein.

E. WORK FENCE ENCLOSURE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. The Contractor shall furnish and erect a wood fence to the extent shown on the drawings enclosing the entire project on all sides. All materials used shall be new. Any permit required for the installation and use of said fence shall be borne by the Contractor.
2. THE FENCE shall be 7'-0" high with framing construction of yellow pine, using 4" x 4" posts on not more than 6'-0" centers, with three (3) rails of at least 2" x 4" size to which shall be secured boards, 3/4" x 6" tongue and groove, laid solid and surface and double nailed to each bearing. Posts shall be firmly fixed in the ground at least 30" and thoroughly braced. Top edge of fence shall be trimmed with a rabbeted edge mould. Provide on the street traffic sides of fence, observation openings as directed. The Contractor has the option of using 1/2" exterior grade plywood in lieu of the 3/4" x 6" tongue and groove boards.
3. GATES - Provide an adequate number of double gates, complete with hardware, located as approved by the Resident Engineer. Double gates shall have a total clear opening of 14'-0" with two (2) 7'-0" hinged swinging sections. Hanging posts shall be 6" x 6" and shall extend high enough to receive and be provide with tension or sag rods for the swinging sections.
4. PAINTING - The fence and gates shall be entirely painted on the street and public sides with two (2) coats of approved lead and oil paint. The below-grade section of the posts shall be first creosoted or given a coat of tar base paint. Black stenciled signs reading "POST NO BILLS" shall be painted on fence with three (3) inch high letters on 25 foot spacings for the entire length of fence on street traffic sides. Signs shall be stenciled five (5) feet above the sidewalk.
5. It shall be the obligation of the Contractor to remove all posters, advertising signs, and markings, etc., immediately.
6. Where sidewalks are used for "drive over" purposes for Contractor vehicles, a suitable wood mat or pad shall be provided for protection of sidewalks.
7. Where required, make provision for fire hydrants, lampposts, etc.
8. REMOVAL - When directed by the Resident Engineer, the fence shall be removed.

F. PUMPING

1. 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.
2. All pumps shall be maintained at all times in proper working order.

G. RESIDENT ENGINEER'S OFFICE

1. OFFICE SPACE IN EXISTING BUILDING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)
 - a. The Resident Engineer will arrange for office space for sole use in the building where work is in progress. The Contractor for General Construction Work shall provide and install a lockset

for the door to secure the equipment in the room. The Contractor for General Construction Work shall provide two (2) keys to the Resident Engineer. After completion of the project the Contractor for General Construction Work shall replace the original lockset on the door and ensure its proper operation.

- b. The Contractor for General Construction Work shall provide one (1) telephone, where directed, for the exclusive use of the Resident Engineer. The Contractor for General Construction Work shall pay all costs for telephone service for calls within New York City limits for the duration of the project. The telephone service shall continue for a period of 90 days following substantial completion.
- c. The Contractor for General Construction Work shall provide the following equipment:
 - (1) 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) lockers, metal olive green or gray, 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 1/2"D x 18"W in a grey finish by Art Steel No. 2904L or approved equal.
 - (2) One (1) 9000 B.T.U. air conditioner or as directed by Commissioner. Wiring for the air conditioner shall be minimum No. 12 AWG fed from individual circuits in the fuse box.
 - (3) Two (2) metal wastebaskets, 13 inches square 15 inches high with rubber feet and corners by Art Metal Company No. 168 or approved equal.
 - (4) One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
 - (5) 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.

2. TRAILER OFFICE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- a. The Contractor for General Construction Work shall provide at its own cost and expense a trailer and install and connect all utility services to trailer within twenty (20) days of start of work. The trailer shall have equipment having the minimum requirements hereinafter specified. Any permit required for the installation and use of said trailer shall be borne by the Contractor.
- b. The trailer shall remain the property of the Contractor for General Construction Work except that the file cabinets herein specified, shall become the property of the City of New York.
- c. Trailer shall be office type trailer of the following general minimum dimensions:
 - 1. Length, overall: 35 feet.
 - 2. Length, inside: 32 feet.
 - 3. Width, overall: 8 feet.
 - 4. Width, inside: 7 feet, 5 inches.
- d. Trailer shall be manufactured by International Trailer Company, Model No. 1 MU-35-D or Atlantic Trailer Corporation, Model No. F-36 or approved equal.
- e. The exterior of the trailer and the wheels shall be given an approved coat of exterior enamel. The enamel finish coat shall be DUPONT orange lacquer or approved equal. The trailer shall 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 STRUCTURES	3-1/2"
RESIDENT ENGINEER'S OFFICE	2-1/2"

NOTE: In lieu of painting letters on trailer the Contractor for General Construction Work may substitute a sign constructed of a good quality lumber with the same type and size of lettering above.

- f. All windows and doors shall have insect aluminum screens and wire mesh protective screening.
- g. The interior shall be finished in 1/4 inch plywood. Plywood shall be finished in natural color, with two (2) coats of varnish or lacquer.
- h. The interior shall be divided by partitions into one (1) large room in front of trailer, and a private office approximately 6' x 7' at rear of trailer and a washroom located adjacent to the private office.
- i. The washroom shall be equipped with a flush toilet, wash basin with two (2) faucets, medicine cabinet, complete with supplies by Hospital Supply and Watters Labs., Inc., Model No. 1 or approved equal and a toilet roll tissue holder. Plumbing and fixtures shall 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 shall be furnished.
- j. The heating system shall consist of thermostatically controlled electric baseboard heaters capable of delivering not less than 30,000 BTU per hour and heaters shall be as manufactured by Chromalox or approved equal, sized per area with individual approved thermostats.
- k. The trailer shall be equipped with an approved two-circuit, 110-120 volt armored cable wiring system of adequate capacity complete with entrance connector with provision for grounding, enclosed fused service switch and branch circuit fuse box. The circuits for lighting, water heater, heater and convenience outlets, etc. shall be two-conductor, No. 12. The circuits for the space heaters shall be sized minimum No. 12 wire led from individual circuits in the branch circuit fuse box. Metal boxes shall be provided at all outlet points. All wiring shall conform to the requirements of the Electrical Code of the City of New York for armored cable wiring systems.
- l. Lighting to be furnished by a minimum of four (4) 48 inch, single tube, fluorescent fixtures for the large rooms and an incandescent fixture for the washroom. Lighting fixtures shall be provided with built-in pull-chain switches. A minimum of six (6) duplex convenience outlets shall be installed; four (4) in the larger room and two (2) in the smaller room. These outlets shall be in addition to connections for electric space heaters and heaters for domestic hot water.
- m. In addition to the washroom and private office, the following shall be built-in to the trailer:
 - 1. The drafting or reference table at least 60 inches long by 36 inches wide with cabinet below, head shelf at each end of the trailer, wall type plan rack at least 42 inches wide and wardrobe opposite washroom.
- n. The following movable equipment shall be furnished:
 - 1. Four (4) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Four (4) lockers, metal olive green or gray, 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 1/2" D x 18"W in a grey finish by Art Steel No. 2904L or approved equal.
 - 2. One (1) 6000 B.T.U. and one (1) 9000 B.T.U. air conditioner. Wiring for the air conditioners shall be minimum No. 12 AWG fed from individual circuits in the fuse box.

3. Two (2) metal wastebaskets, olive green or grey finish, 13 inches square 15 inches high with rubber feet and corners by Art Metal Company No. 168 or approved equal.
 4. One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
 5. 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.
- o. TRAILER TEMPORARY SERVICE - Plumbing and electrical work required for the trailer will be furnished and maintained as below.
1. PLUMBING WORK - shall include all water supply and drainage piping required for a complete installation. Contractor to provide a temporary water service from the City's water main and extend in the trailer and properly connect up all fixtures requiring water supply. Provide all necessary soil, waste, vent and drainage piping.
 - a. Plumbing Contractor to frost-proof all water pipes to prevent freezing.
 - b. REPAIRS, MAINTENANCE - The Plumbing Contractor provide repairs when and as required for a period of thirty (30) days after the date of substantial completion acceptance.
 - c. DISPOSITION OF PLUMBING WORK - At the expiration of the time limit set forth in Subparagraph 3, the water drainage connections and piping to the office trailer shall be removed and shall be plugged at the mains. All piping shall become the property of the Contractor for Plumbing Work and shall be removed from the site, all as directed. All repair work due to these removals shall be the responsibility of the Contractor for General Construction Work.
 2. ELECTRICAL WORK - The Contractor for Electrical Work shall furnish, install and maintain a temporary electric feeder to the trailer to be used by the Resident Engineer immediately after it is placed at the job site.
 - a. The temporary electric feeder shall be at least three (3) No. 6RH wire and shall be protected by a 60 Ampere fused safety switch, complying with codes and utility requirements having jurisdiction.
 - b. Make all arrangements and pay all costs to provide electric service.
 - c. 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 a period of thirty (30) days after the date of substantial completion acceptance.
 - d. Disposition of Electric Work: At the expiration of the time limit set forth, the temporary feeder, safety switch, etc., shall be removed and disposed of as directed.
 - e. All repair work due to these removals shall be the responsibility of the Contractor.
- p. MAINTENANCE
1. The Contractor for General Construction Work shall provide and pay all costs for hot and cold water, heat and fuel and regular daily janitor service. Furnish toilet paper, cloth towels and soap and maintain the field office in first-class condition, including all repairs, until 30 days after the date of substantial completion acceptance.
 2. Provide fire, extended coverage and vandalism, malicious mischief and burglary and theft

insurance coverage for the Resident Engineer's field office equipment in the amount of \$10,000. All insurance coverage shall be provided by a company licensed and authorized to do business in the State of New York. Such coverage must, under the loss payable clause or by endorsement thereon, state the following: "loss, if any, payable to the City of New York."

3. At 30 days after the date of substantial completion acceptance, or sooner as directed by the Commissioner, the Contractor for General Construction Work shall have all services disconnected and capped to the satisfaction of the Resident Engineer.
- q. The Contractor for General Construction Work shall provide and pay all costs for the following telephone services for the Resident Engineer's trailer:
 1. Two (2) desk phones
 2. One (1) wall phone (with six (6) foot extension cord) at plan table.
 3. A remote bell located on outside of trailer
 4. The telephone service shall continue for a period of 90 days following substantial completion.
- r. Should it become necessary to relocate the trailer or move the field office from one (1) location to another, Contractor for General Construction Work shall be responsible for move or moves and of reconnecting all utilities described above at new location, and shall assume all costs incurred.
- s. PERMITS - The Contractor for General Construction Work shall make the necessary arrangements and obtain all permits required for this work.
- t. The Contractor for General Construction Work has the option of providing, at its cost and expense, rented office or store space in lieu of trailer. Said space shall be in the immediate area of the Project and have adequate plumbing, heating and electrical facilities. Space chosen by the Contractor for General Construction Work must be approved by the Commissioner before the area is rented. All insurance maintenance and equipment required for trailer field office shall also apply to rented spaces.

H. **ADDITIONAL EQUIPMENT FOR THE RESIDENT ENGINEER (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. The Contractor for General Construction Work shall supply photo equipment not to exceed \$250. Said equipment to be specified by Resident Engineer. At the completion of the project, the equipment shall become the property of the City of New York.
2. The Contractor for General Construction Work shall provide a copy machine for paper sizes 8½ x 11 & 8½ x 14. Copier shall remain at job site 30 days beyond the Substantial Completion date.
3. The Contractor for General Construction Work shall furnish a fax machine and a telephone answering machine at commencement of the project. All materials shall be new, sealed in manufacturer's original packaging and shall have manufacturers' warranties. All items shall remain the property of the City of New York at the completion of the project.
4. Computer Workstation (Refer to the Addendum to the General Conditions for the number of Computer Workstations to be provided):

Computers shall be provided for all contracts that have a total duration of 180 Consecutive Calendar Days (CCDs) or more, as set forth in Schedule "A". Contracts that have a total duration of less than 180 CCDs shall not require computers. Computer workstations shall be provided for

the duration of the contract.

(1) Personal Computer(s) - Workstation Configuration.

- (a) Make and Model: Dell, Gateway, Toshiba, HP, IBM, or an approved equal. (Note: an approved equal requires written approval of the Assistant Commissioner of ITS.)
- (b) Processor: 3.0 GHz Pentium 4 or faster computer - Single Processor.
- (c) System RAM: Minimum of 1 GB (Gigabytes) of SDRAM or DDR.
- (d) Hard Disk Drive(s): 80 GB (Gigabytes) or larger.
- (e) CD-RW: Internal CD-RW, 48x Speed or faster.
- (f) 16xDVD+/RW: DVD Burner (with double layer write capability) 16x Speed or faster
- (g) I/O Ports: Must have at least one (1) Serial Port one, (1) Parallel Port, 2 USB Ports. Serial Ports must consist of UART 16550 Chip or better.
- (h) Video Display Card: PCI Interface with a minimum of 64 MB of RAM.
- (i) Monitor: 17" TFT LCD monitor.
- (j) Available Exp. Slots: System as configured above shall have at least two (2) full size PCI Slots available.
- (k) Fax/Modem: Internal Fax/Modem 56 Kbps speed, featuring 3COM or US Robotics Chipset and supporting a minimum of V.92 and MNP5 compliant. Integrated 10/100/1000 Ethernet.
- (l) Other Peripherals: Optical scroll Mouse, 101 Key Keyboard, Mouse Pad and all necessary cables.
- (m) Software Requirements: Microsoft Windows XP Professional, Microsoft Office 2003 Professional, Microsoft Project 2002 Professional, Adobe Acrobat reader, Anti-Virus software package with one year updates subscription, Win Zip and Auto Cad 2008 LT.

(2) All field offices requiring computers shall be provided with the following:

- (a) One (1) broad-band internet service account. This account will be active for the life of the project.
- (b) One (1) 600 DPI HP Laser Jet Printer (twelve (12) pages per minute or faster) with one (1) Extra Paper Tray (Legal Size)
- (c) All necessary Cabling
- (d) Storage Boxes for and Blank CDs/DVDs
- (e) Printer Table
- (f) UPS/Surge Suppressor combo

(3) All Computer Hardware shall come with a three (3) year warranty for on-site repair or replacement. Additionally, and notwithstanding any terms of the warranty to the contrary, the Contractor is responsible for rectifying all computer problems or equipment failures within one (1) business day.

- (4) An adequate supply of blank CD's/DVD's, and paper and toner cartridges for the printer shall be provided by the Contractor, and shall be replenished by the Contractor as required by the Engineer.
- (5) It is the Contractor's responsibility to ensure that electrical service and phone connections are also available at all times; that is, the Field Office Computer(s) is to be powered and turned on twenty four (24) hours each day.

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 Raul Canabal, Assistant Commissioner of Information Technology Services at 718-391-1668.

I. PUBLIC TELEPHONE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. The Contractor shall provide a public telephone located on the site, where directed, for the duration of the Contract.

J. HEAD PROTECTION (HARD HATS)

1. The Contractor shall provide a minimum of 10 standard protective helmets for the exclusive use of Department of Design and Construction personnel and their visitors. Helmets shall be turned over to the Resident Engineer and kept in the office of the Resident Engineer.
2. Upon completion of the project, the helmets shall become the property of the Contractor.

K. RODENT AND INSECT CONTROL

1. **DESCRIPTION** - The General Contractor shall 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:
 - a. Wet areas within the project area, including all temporary structures.
 - b. All exterior and interior temporary toilet structures within the project area.
 - c. All Field Offices and shanties within the project area of all Contractors and the Department of Design and Construction (DDC).
 - d. 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.
 - e. Any other portion of the premises requiring such special attention.
2. **MATERIALS:** All materials shall be approved by the New York State Department of Environmental Conservation 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
3. **PERSONNEL:** All pest control personnel must be supervised by an exterminator licensed in categories 7A & 8.
4. **METHODS**

- a. Application and dosage of all materials shall be done in strict compliance with the manufacturer's recommendations.
- b. Under the Maintenance of Site item (section 1.42.L), any unsanitary conditions, such as uncollected garbage or debris, resulting from the General Contractor's activities which will provide food and shelter to the resident rodent population shall be corrected by the General Contractor immediately after notification of such condition by the Commissioner

5. RODENT CONTROL WORK

- a. 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 shall be used in areas within seventy-five (75) feet of all streambanks. Live traps must be used in these seventy-five (75) foot buffer zone areas and within wetland and woodland areas.
- b. 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 shall be placed during the period of construction and any consumed or decomposed bait shall be replenished as directed.
- c. At least one 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, shall be placed at locations that are inaccessible to pets, human beings, children and other non-target species, particularly wildlife (for example birds) in the project area.
- d. The General Contractor shall be responsible for collecting and disposing of all trapped and poisoned rodents found in live traps and tamper proof bait stations. The General Contractor shall also be responsible for posting and maintaining signs announcing the baiting of each particular location.

The General Contractor, under his/her Maintenance of Site operations, shall be responsible for the immediate collection and disposal of any visible rodent remains found on streets or sidewalks within the project area.

- e. It is anticipated that public complaints will be addressed to the Commissioner. The General Contractor, where directed by the Commissioner, shall 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.
- f. Emergency service during the regular workday hours (Monday through Friday) shall be rendered within 24 hours, if requested by the Commissioner, at no additional cost to the City.

6. EDUCATION & TRAINING

- a. The General Contractor shall post notices on all Construction Bulletin Boards advising workers, employees, and residents to call the Engineer's Field Office to report any infestation or outbreak of rodents, rats, mice, water beetles, roaches and fleas within the project area. The General Contractor shall provide and distribute literature pertaining to 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.
- b. Prior to application of any chemicals, the General Contractor shall furnish to the Commissioner copies or sample labels for each pesticide, antidote information, and Material Data Safety Sheets (MSDS) for each chemical used.

7. RECORDS AND REPORTS

- a. The General Contractor shall keep a record of all rodent and waterbug infestation surveys conducted by him/her and make available, upon request, to the Commissioner. The findings of each survey shall include, but not be limited to, recommended Integrated Pest Management (IPM) techniques, like baiting, trapping, proofing, etc., proposed for rodent and waterbug pest control.
- b. The General Contractor shall maintain records of all locations baited along with the type and quantity of rodenticide and insecticide bait used.

L. SITE SECURITY/PERIMETER SIGNAGE

1. In order to properly convey notice to persons entering upon a City construction site, the Contractor shall furnish and install a sign at the entrance (gates) as follows:

NO TRESPASSING

AUTHORIZED PERSONNEL ONLY

2. If no construction fence exists at the site, this notice shall be conveyed by incorporating the above language into safety materials (barriers, tape, and signs).

M. MAINTENANCE OF SITE AND ADJOINING PROPERTY

1. Take over and maintain the site, after order to start work.
2. Until the work of the Contract is completed and accepted, the Contractor shall be responsible for the safety of the adjoining property, including sidewalks, paving, fences, sewers, water, gas, electric and other mains, pipes and conduits etc. The Contractor shall, at its own expense, except as otherwise specified, protect same and maintain them in least as good a condition as that in which the Contractor finds them.
3. All pavements, sidewalks, roads and approaches to fire hydrants shall be kept clear at all times, maintained and repaired to serviceable condition with materials to match existing.
4. Provide and keep in good repair all bridging and decking necessary to maintain vehicular and pedestrian traffic.
5. The Contractor shall also remove all snow and ice as it accumulates on the sidewalks within the Contract Limits Lines.

N. SAFETY PRECAUTIONS FOR CONTROL CIRCUITS

1. Control circuits, the failure of which will cause a hazard to life and property, shall comply with the New York City Dept. of Buildings, Bureau of Electrical Control requirements.

O. OBSTRUCTIONS IN DRAINAGE LINES

1. The Contractor shall 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 shall be kept clear of any and all debris. Any stoppage shall be repaired immediately at the expense of the Contractor for General Construction Work.

P. MAINTENANCE OF PROJECT SITE

1. Take over and maintain all project areas, after order to start work.
2. Until the work of the Contract is completed and accepted, the Contractor shall be responsible for the safety of all project areas, including water, gas, electric and other mains and pipes and conduits and shall at the Contractor's own expense, except as otherwise specified, protect same and maintain them in at least as good condition as that in which the Contractor finds them.
3. All pavements, sidewalks, roads and approaches to fire hydrants shall be kept clear at all times, maintained, and if damaged, repaired to serviceable conditions with materials to match existing.
4. The Contractor shall keep the space for the Resident Engineer in a clean condition.

Q. PROJECT SIGN AND RENDERING
PART A – PROJECT SIGN

1. Responsibility: The Contractor shall produce and install one (1) project sign which shall be posted and maintained upon the site of the project at a point and in a position where directed by the Commissioner. The Contractor shall protect the sign from damage during the continuance of work under the Contract and shall do all patching of lettering, painting and bracing thereof necessary to maintain same in first class condition and in proper position. Prior to fabrication, contractor shall submit an 8-1/2" x 11" color match print proof from the sign manufacturer of completed sign for approval by the Commissioner.
2. Sign Quality: The Contractor shall provide all materials required for the production of the sign as specified herein. Workmanship shall be of the best quality, free from defects and shall be produced in a timely manner.
3. Schedule: Upon project mobilization, the Contractor shall commence production and installation of the sign.
4. Removal: At the completion of all work under the Contract, the Contractor shall remove and dispose of the project sign away from the site.
5. Sign construction:
 - a. Frame: The frame shall be from quality dressed 2"x2" pine, fire retardant, pressure treated lumber, that surrounds the inside back edge of the sign. The sign shall have one (1) intermediate vertical and two (2) diagonal supports, glued and screwed for rigidity. Frame shall be painted white with two (2) coats of exterior enamel paint, prior to mounting of sign panel.
 - b. Edging: U-shaped, 22 gauge aluminum edging, with a white enameled finish to match sign background, shall run around entire edging of sign panel and frame. Corners shall be mitered for a tight fit. Channel dimensions shall 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 shall be constructed in one (1) piece of 14 gauge (.0785") 6061-T6 aluminum. This panel shall be prefinished both sides with a glossy white baked-on enamel finish and be flush with edge of 2" x 2" wood frame. Samples must be submitted for approval.
 - d. Fastening: Fasten sign panel to wood frame using cadmium plated no. 8 sheet metal screws at 1/2" below edge of panel and 8" on center. The U-shaped aluminum channel shall 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. All visual components of the sign are in an Adobe *.pdf file, which is provided by the

Commissioner's representative. The file is to be opened in Acrobat Professional or Acrobat Approval in order to be saved with project information. The Commissioner's representative shall insert the project name and names and titles of personnel (3 or more) and any other required information associated with the project. At no point in the update, saving or renaming of the file should it be locked by any user. The digital file shall be provided by DDC to the Contractor (on a CD or via E-mail) for printing.

- b. The DDC *.pdf file with names provided by the commissioner shall be reproduced at the Sign Panel size of 4' x 8' on 3M High Performance Vinyl or approved equal. The sign manufacturer is required to print from the Acrobat *.pdf provided, and must match the following colors specified by Pantone: 3025 C, 119 C, 131 C, 1805 C, 1817 C in their exact locations as indicated in the *.pdf file, and on the DDC website: www.nyc.gov/buildnyc.
- c. Color shall be created in a four-color process to reproduce Pantone Colors (per Pantone formula).
 1. Pantone color 3025 C (C-100, M-17, Y-0, K-51).
 2. Pantone color 119 C (C-0, M-12, Y-100, K-49).
 3. Pantone color 131 C (C-0, M-32, Y-100, K-23).
 4. Pantone color 1805 C (C-0, M-91, Y-100, K-23).
 5. Pantone color 1817 C (C-0, M-90, Y-100, K-66).

The typeface, Helvetica shall be used in all text-fields as is specified in the settings of the Acrobat *.pdf.

Note: 3M High Performance Vinyl or equivalent shall be guaranteed for nine (9) years. Guarantee must cover fading, peeling, chipping or cracking.

PART B – PROJECT RENDERING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. **Responsibility:** In addition to the Project Sign, the Contractor shall furnish and install one (1) sign showing a rendering of the project. From an approved image file provided by the DDC, the Project Rendering is to be sized, printed, and mounted in an identical manner as described in Part A above for the Project Sign. Any area of the 4' X 8' panel area not filled by the rendering shall be printed in Pantone color 3025 (c-100, M-17, y-0, K-51). 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 shall be mounted with a perfect match of the short sides of the rectangle so that the Rendering Sign and the Project Sign together will create one long rectangle.
2. **Removal:** At the completion of all work under the Contract, the Contractor shall remove and dispose of the project rendering away from the site.

R. PLANT PEST CONTROL REQUIREMENTS and TREE PROTECTION REQUIREMENTS

1. **Plant Pest Control Requirements:** The Contractor for General Construction Work (the "Contractor") and its subcontractors, including the Certified Arborist described below, shall comply with all Federal and New York State laws and regulations concerning Asian Longhorned Beetle (ALB) management, including protocols for ALB eradication and containment promulgated by the New York State Department of Agriculture and Markets (NYSDAM). The Contractor is referred to: (1) Part 139 of Title 1 NYCRR, Agriculture and Markets Law, Sections 18, 164 and 167, as amended, and (2) State Administrative Procedure Act, Section 202, as amended.

- a. All tree work performed within the quarantine areas must be performed by New York State Department of Agriculture and Markets (NYSDAM) certified entities. Transportation of all host material, living, dead, cut or fallen, inclusive of nursery stock, logs, green lumber, stumps, roots, branches and debris of a half inch or more in diameter from the quarantine areas is prohibited unless the Contractor or its sub contractor performing tree work has entered into a compliance agreement with NYSDAM. The terms of said compliance agreement shall be strictly complied with. Any host material so removed shall be delivered to a facility approved by NYSDAM. For the purpose of this contract host material shall be ALL species of trees.
 - b. Any host material that is infested with the Asian Longhorned Beetle must be immediately reported to NYSDAM for inspection and subsequent removal by either State or City contracts, at no cost to the Contractor.
 - c. Prior to commencement of tree work, the Contractor shall submit to the Commissioner a copy of a valid Asian Longhorned Beetle compliance agreement entered into with NYSDAM and the Contractor or its sub contractor performing tree work. If any host material is transported from the quarantine area the Contractor shall 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.
 - d. Quarantine areas, for the purpose of this contract shall be defined as all five boroughs of the City of New York. In addition, prior to the start of any tree work, the Contractor shall contact the NYC Department of Parks & Recreation's Director of Landscape Management at (718) 699-6724, to determine the limits of any additional quarantine areas that may be in effect at the time when tree work is to be performed. The quarantine area may be expanded by Federal and State authorities at any time and the Contractor is required to abide by any revisions to the quarantine legislation while working on this contract. For further information please contact: NYSDAM (631) 288-1751.
2. Tree Protection Requirements: The Contractor shall retain a Certified Arborist, as defined by New York City Department of Parks and Recreation (NYCDPR) regulations, to provide the services described below.
- a. Surveys and Reports: The Certified Arborist shall, 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 above; (3) evaluation of the general health and condition of any infected plant material.
 - b. Frequency of Reports: The Certified Arborist shall 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 24 months in duration, the Certified Arborist shall conduct a survey and prepare a report at the midpoint of construction. Copies of each plant material assessment report shall be submitted to the Resident Engineer within two (2) weeks of the survey.
 - c. Proximity to Project Site: Off-site trees, significant shrubs and/or planting masses shall be considered to be located in proximity to the project site under the circumstances described below.
 1. The tree trunk, significant shrub, or primary cluster of stems in a planting mass is within 50 (fifty) feet of the project's Contract Limit Lines (CLLs) or Property Lines (PLs).
 2. Any part of the tree or shrub stands within 50 (fifty) 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.

3. 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 50-foot inclusionary perimeter as outlined above.

- d. Tree Protection Plan: The Certified Arborist shall prepare, and the Contractor shall 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 NYCDPR jurisdiction as determined by the Department of Transportation, and (4) all trees that are located in proximity to the project site, as defined above. The Tree Protection Plan shall comply with the NYC DPR rules, regulations and specifications. The Contractor is referred to Chapter 5 of Title 56 of the Official Compilation of the Rules of the City of New York. Copies of the Tree Protection Plan shall be submitted to the Resident Engineer prior to the commencement of construction. Implementation of the Tree Protection Plan for street trees and trees under NYCDPR jurisdiction shall 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 50 feet of the intersection of the project's site's property line with the street frontage property line.

3. No Separate Payment. No separate payment shall 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 shall be deemed included in the Contractor's bid for the Project.

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FMS ID: S195-227S



**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

Spring Street Salt Shed Construction

**LOCATION: 553 Canal Street
BOROUGH: Manhattan 10013
CITY OF NEW YORK**

OLIVEIRA CONTRACTING INC.

Contractor

Dated FEBRUARY 27TH , 20 14

Approved as to Form
Certified as to Legal Authority

W. J. Valeri

Acting Corporation Counsel

Dated August 15 , 20 13

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____ , 20 _____

Rd 8/15/13





PROJECT ID:

S195-227S

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

LAW

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

VOLUME 3 OF 3

**ADDENDUM TO THE GENERAL
CONDITIONS**

SPECIFICATIONS

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

Spring Street Salt Shed Construction

LOCATION:
BOROUGH:
CITY OF NEW YORK

553 Canal Street
Manhattan 10013

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

Dept of Sanitation

Dattner Architects

Date:

August 2, 2013

4-018







THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

September 4, 2013

ADDENDUM No. # 1

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

S195-227S

Spring Street Salt Shed

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. Revised Pre-Bid Conference Date:

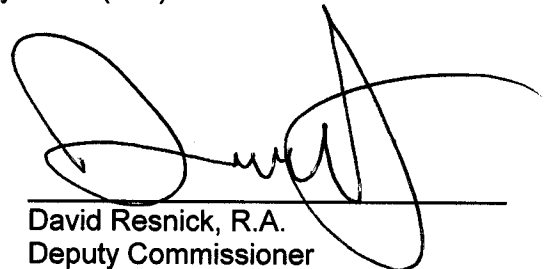
The Pre-Bid Conference/ Site Visit for the Contract described below scheduled for September 25th, 2013, at 10:00am at 553 Canal Street is rescheduled to September 17th, 2013, at 10:00am at 553 Canal Street.

Follow by a Pre-Bid Meeting at 1pm, September 17, 2013 at DDC Office, Conference Room 401, 30-30 Thomson Avenue, 4th Floor, Long Island City, New York 11101.

Contract 1 – General Construction Work.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.
Deputy Commissioner

Name of Bidder

By: _____





THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

September 13, 2013

ADDENDUM No. # 2

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

S195-227S

Spring Street Salt Shed Construction

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. Questions from Bidders and Responses to Questions:

See Attachment A.

2. Revisions to the Specifications:

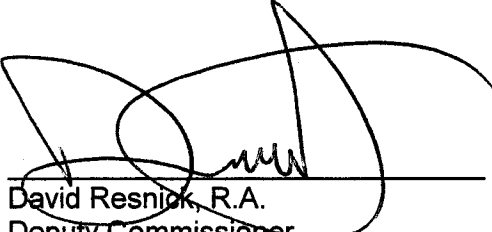
See Attachment B.

3. Revisions to the Bid Booklet:

Delete page 21-6 & 21-8 and replace with 21-6R & 21-8R, included with this Addendum.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.
Deputy Commissioner

Name of Bidder

By: _____



DDC PROJECT #: S195-227S

PROJECT NAME: Spring Street Salt Shed Construction

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Can a BIM model be made available to bidders?	A project BIM model CD will be available for pick up at DDC. In addition, it will be available for download on the DDC website.
2	MS1 Roof Topping: Drawing A-400.00 shows a 2" grout topping and Drawing S-305.00 calls for a 3" composite concrete topping. Please clarify.	The roof planks grout topping shall be 3" composite CIP concrete topping overlay as shown on Drawing S-305.00. The 2" grout topping shown on the Architectural Drawings over the roof planks shall be replaced with 3" thick composite CIP concrete topping.
3	MS2 Rebar Splices: Can vertical wall rebar be spliced or is the design intent to be full length bars as drawn in the structural sections?	The vertical wall rebar shall be full length as shown and indicated on the drawings.
4	Please provide CAD files for the Spring Street Salt Shed bid.	CD's containing CAD files will be available for pick up at DDC. In addition, the CAD files will be available for download on the DDC website.
5	Scope of Site Work: Please confirm that the entire area of site work between the new building, new drive, Canal Street, West Street, and Spring Street include curbs, as shown on drawing A-101.00.	Scope confirmed



	<p>Location of Interior Steel Cladding: The Structural drawing (S-307.00) shows the 8' tall steel plates at the bottom of walls align with the designed face-of-wall. In order to achieve this, the wall surface is recessed. The Architectural sections (A-301.00) show the plates attached to the designed face-of-wall. Which is correct? We suggest for the purpose of facilitating replacement of the steel panels it is best to not have the wall mounting surface recessed.</p>	<p>The interior Steel Plate Wall Protection (cladding) details shall be as shown on Structural drawing S-307.00, with the steel plates recessed into wall surface so it will be cast with concrete.</p>
7	<p>Layout of Wall Vertical Control and Construction Joints: The plans (A-211.00 through A-214.00, 2/ A-403.00, 1/S-111.00) suggest that the spacing of vertical joints, and consequently the tie pattern, on each wall is laid out on a straight line at the bottom of the wall running from corner-to-corner, call this the reference line, and the joint lines are then plumbed on a lines spaced 8' apart and square to this reference line. One effect of this is that at the face of the wall, because the line of the bottom of the wall is, to varying degrees, oblique to the reference line, the spacing of the lines measured on the face of the will deviate from the designed 8' spacing. A second effect, because the plane of the wall is typically not plumb, is that the reveal lines will not be plumb in the plane of the wall. Please confirm that this condition is the intent of the design. Please also advise on how to determine the reference line for each wall.</p>	<p>The design intent is to have all horizontal construction joints follow level around the entire exterior at 8'-0" spacing (vertically). Vertical joints are perpendicular to the horizontal joints (reference lines are in the Revit Model) in the plane of the individual wall facets. Where vertical joints cross facet "creases" continue the vertical joint in the plane of the next facet.</p>
8	<p>Scope of Demolition: What demolition, in addition to removing paving for utility installations and that required for relocation of one street light, will be required in the scope of work. For example, will demolition of existing structures be required for the new street curb and sidewalk work? And in the area of the new building, is it intended that the site will have been prepared prior to the start of construction so that the new work can be started and continue uninterrupted without the need to remove structures?</p>	<p>Demolition of the existing garage structure is not included in the scope of this contract. It will be demolished "by others" under a separate contract.</p> <p>The scope of demolition for this project includes the removal of existing sidewalks, curbs, etc., and removal & relocation of street/sidewalk lighting indicated in the contract documents that is necessary to perform the construction scope.</p> <p>In addition, the scope of this project are clearly identified in the contract documents – including, but not limited to, construction of the building; installation of new sidewalks and site paving; landscape and tree pits, curbs, and site utility connections into the street.</p>



	<p>Wall Tie Layout: Please confirm that the orientation of the concrete ties in the building walls is at the contractor's option, as long as the specified outside layout on drawing 2/A-403.00 and structural requirements are maintained. That is, the ties are not necessarily level and square to the Architectural layout reference line; thus, ties could be installed square to the plane of the outside face of the wall, and their Architectural layout would not need to be maintained on the inside face of the wall.</p>	<p>Confirmed.</p>
<p>10</p>	<p>Liquid Calcium Chloride Tanks: In the Addendum to the General Conditions the project description includes "...two 5,000 gallon liquid calcium chloride tanks with associated dispensing equipment and concrete protection wall." Protection wall information are found in drawings (A-402.00 & S-110.00) but no description of the tanks or equipment. Are the tanks and equipment to be included in the scope? If so, please provide information. If not, please confirm that the protection wall is included in the project scope.</p>	<p>Procurement and installation of the Liquid Calcium Chloride Tank system (including associated dispensing equipment) will be provided "by others" under a separate contract, so they are not included in the scope of work for this contract.</p> <p>The concrete protection wall is included in the scope of work for this contract.</p>
<p>11</p>	<p>Trench Drain Against Building: Please confirm that the trench drain will be installed according to detail 1/C-102 on drawing C-105.00, except that the "compressible Filler" is against the face of the building, as shown in detail 9/A-402.00, rather than recessed from the face. That is, the drain will be a precast structure that includes the support for its cover; it will be placed against the building, and it will be held in place by an isolated concrete structure; other details showing the structure holding the drain to be continuous with sidewalk concrete (1/C-105.00, 4 & 9/A-402.00) will not be used.</p>	<p>Confirmed – compressible filler is between drain assembly and face of building. Use detail 1/C-102 on drawing C-105.00 with above modification. Note that 1/C-102 on drawing C-105.00 incorrectly labels the granite base as compressible filler.</p> <p>A revised detail/ sketch will be issued to correctly identify the compressible filler and the granite base.</p>
<p>12</p>	<p>Please provide a Microsoft Excel file of the Bid Breakdown form.</p>	<p>The Bid Breakdown form is available only in PDF format.</p>



C PROJECT #: S195-227S

PROJECT NAME: Spring Street Salt Shed Construction

ATTACHMENT B – REVISIONS TO THE SPECIFICATIONS

1. Refer to Table of Contents (Included with this Addendum)
Revision to Table of Contents to include Specification Sections 04851 Dimension Stone Cladding & 10522 Fire Extinguishers.
2. Refer to Section 04851 Dimension Stone Cladding (Included with this Addendum)
Add Specification Section 04851 Dimension Stone Cladding.
3. Refer to Section 10522 Fire Extinguishers (Included with this Addendum)
Add Specification Section 10522 Fire Extinguishers.



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CONTRACT NO. 1 - GENERAL CONSTRUCTION

DIVISION 1 – GENERAL REQUIREMENTS

Not Required

DIVISION 2 - SITE CONSTRUCTION

02200	Earthwork
02260	Excavation Support and Protection
02470	Drilled Caisson Piles
02503	Installation of Buried Pipelines
02504	Sanitary and Storm Sewer Structures
02505	Leakage Tests
02745	Cast Laminated Glass Pavers
02762	Traffic Paint Pavement Markings
02771	Concrete Curbs, Headers and Sidewalks
02780	Unit Pavers
02826	Decorative Metal Fences and Gates
02930	Exterior Plants

DIVISION 3 – CONCRETE

03100	Concrete Forms and Accessories
03200	Concrete Reinforcement
03300	Cast-in-Place Structural Concrete
03330	Architectural Cast-in-place Concrete
03350	Concrete Finishes
03411	Precast Concrete Hollow Core Planks

DIVISION 4 - MASONRY

04851	Dimension Stone Cladding
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DIVISION 5 - METALS

05120	Structural Steel
05500	Metal Fabrications
05510	Exterior Metal Stairs
05532	Stainless Steel Floor Grating and Plate
05730	Decorative Metal Railings

DIVISION 6 - WOOD AND PLASTICS

06100	Rough Carpentry
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DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07124 Ethylene-Propylene-Diene-Monomer (EPDM) Roofing
07130 Foundation Waterproofing
07620 Sheet Metal Flashing and Trim
07720 Roof Accessories
07920 Joint Sealants
07921 Concrete Paving Joint Sealants

DIVISION 8 - DOORS AND WINDOWS

08331 Overhead Coiling Doors
08391 Flood Barriers
08620 Unit Skylights

DIVISION 9 - FINISHES

09960 High Performance Coating

DIVISION 10 - SPECIALTIES

10522 Fire Extinguishers

DIVISION 11 - EQUIPMENT

Not Required

DIVISION 12 - FURNISHINGS

Not Required

DIVISION 13 - SPECIAL CONSTRUCTION

13210 Underground Storage Tanks

DIVISION 14 - CONVEYING SYSTEMS

Not Required



DIVISION 15 - MECHANICAL

15050	Basic Mechanical Materials and Methods
15051	Ductile Iron Pipe
15060	Hangers and Supports
15081	Piping Insulation
15120	Interior and Exposed Piping Schedule
15160	Storm Drainage Piping and Vents
15430	Plumbing Specialties
15810	Ductwork
15820	Ductwork Accessories
15830	Fans
15950	Testing, Adjusting and Balancing

DIVISION 16 – ELECTRICAL

16020	Temporary Electrical System
16050	Basic Electrical Materials and Methods
16055	Electrical Requirements for Shop-Assembled Equipment
16060	Grounding
16071	Supporting Devices
16075	Electrical Identification
16080	Electrical Testing Requirements
16121	Wires and Cables-600 Volts and Below
16130	Electrical Raceway Systems
16132	Underground Electrical Distribution System
16140	Wiring Devices
16210	Electric Service
16220	Electric Motors
16411	Disconnect Switches
16443	Panelboards
16491	Control Components and Devices
16500	Lighting Equipment Lamps and Ballasts
16600	Lighting Control System

APPENDIX

Appendix #1 Fixture Schedule

Geotechnical Report for Spring Street Salt Shed dated July 16, 2013 – Prepared by Camp Dresser and McKee.

END OF TABLE OF CONTENTS



SECTION 04851 - DIMENSION STONE CLADDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide stone cladding in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Granite veneer facing stone set in full mortar bed with stainless steel anchors.

- B. Related Sections include the following:

1. Division 3 Section, "Cast-in-Place Structural Concrete" for installing inserts in concrete for anchoring dimension stone cladding.
2. Division 7 Section "Joint Sealants" for sealing joints in dimension stone cladding system.

1.2 SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and other manufactured products indicated.

- B. Shop Drawings: Show fabrication and installation details for dimension stone cladding system, including dimensions and profiles of stone units.

1. Show locations and details of joints both within dimension stone cladding system and between dimension stone cladding system and other construction.
2. Include details of mortar joints and sealant joints.
3. Show locations and details of anchors.
4. Shop drawings shall clearly show stone pattern, the identity and finish of stone, full size details and sections where stones abut other materials, dimensions, thicknesses, and special details.
5. Show direction of grain in stone indicating that stone is to be installed as accepted from site mock-up.

- C. Samples for Initial Selection: For joint materials involving color selection.

- D. Stone Samples for Verification: Sets for each color, grade, finish, and variety of stone required; not less than 12 inches square.

1. Sets shall consist of at least two Samples, exhibiting extremes of the full range of color and other visual characteristics expected and will establish the standard by which stone will be judged.

- E. Colored Pointing Mortar Samples for Verification: For each color required, showing the full range of exposed color and texture expected in the completed Work.

- F. Sealant Samples for Verification: For each type and color of joint sealant required.



- G. Qualification Data: For Installer
- H. Material Test Reports: From a qualified independent testing agency, as follows:
1. Stone Test Reports: For each stone variety proposed for use on this Project provide test data indicating compliance with required physical properties, other than abrasion resistance, according to referenced ASTM standards. Base reports on testing done within previous three years.
 2. For metal components, indicate chemical and physical properties of metal.
 3. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer complying with requirements in Division 7 Section "Joint Sealants" and indicating that sealants will not stain or damage stone. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.
 4. Preconstruction Sealant Field Test Report: From Installer, complying with requirements in Division 7 Section "Joint Sealants."
- I. Engineering Calculations: Submit certification of engineering and design calculations to substantiate the anchoring methods and fastening devices and all stonework elements indicated on the submitted shop drawings. Certification shall state compliance with the following:
1. That calculations establish compliance with specified performance criteria, including magnitude of allowable stress at all principal stonework elements and the structural analysis of all connections. If calculations indicate any deficiencies, provide all items necessary to comply with the performance requirements without cost to the City of New York.
 2. Submit complete test reports from independent laboratories for anchoring devices, sealants, galvanizing, mortars, and all selected stone material in accordance with these specifications.
- J. All certifications shall have the seal and signature of professional engineer licensed in the State of New York.
- K. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in installing dimension stone cladding systems similar in material, design, and extent to that indicated for this Project, whose work has a record of successful in-service performance.
- B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate dimension stone cladding systems similar to that required for this Project and whose products have a record of successful in-service performance.
1. Fabricator's responsibilities include fabricating dimension stone cladding and providing professional engineering services needed to assume engineering responsibility.
 2. Engineering Responsibility: Comprehensive engineering analysis by a qualified professional engineer licensed in the State of New York.
- C. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.



- D. Source Limitations for Stone: Obtain stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.
 - 1. For stone types that include same list of varieties and sources, provide same variety from same source for each.
- E. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from a single manufacturer and each aggregate from one source or producer.
- F. Source Limitations for Other Materials: Obtain each type of stone accessory and other material from a single manufacturer for each product.
- G. Preconstruction Stone Testing: The City of New York will engage and pay a qualified independent testing agency to perform preconstruction testing indicated below.
- H. Preconstruction Stone Testing: Engage a qualified independent testing agency to perform preconstruction testing indicated below.
 - 1. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.
 - 2. Test stone for compliance with physical property requirements of referenced ASTM standard specifications and performance specified herein. Conduct tests using specimens randomly selected from, and representative of, actual materials proposed for the work. Include 50 cycles of freeze thaw testing for each stone used.
 - 3. Test stone for engineering properties to verify assumptions used in the design.
 - 4. Testing agency will report test results in writing to the Commissioner.
- I. Preconstruction Sealant Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for compatibility and adhesion testing according to sealant manufacturer's standard testing methods and Division 7 Section "Joint Sealants," samples of materials that will contact or affect joint sealants.
- J. Preconstruction Field Testing of Sealants: Before installing joint sealants, field test their adhesion to joint substrates per requirements specified in Division 7 Section "Joint Sealants."
- K. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups of typical exterior wall with dimension stone cladding, approximately 72 inches long by 24 inches high.
 - a. Show typical components, attachments to building structure, and methods of installation.
 - b. Include sealant-filled joint complying with requirements in Division 7 Section "Joint Sealants."
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by the Commissioner in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.



1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project in undamaged condition. Provide additional protections as required to protect facade during and after delivery.
- B. Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, and other causes.
 - 1. Do not use pinch or wrecking bars.
 - 2. Lift stone with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone, if required, using dollies with cushioned wood supports.
 - 3. Store stone on wood skids or pallets with non-staining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to stone. Ventilate under covers to prevent condensation.
- C. Mark stone units, on surface that will be concealed after installation, with designations used on Shop Drawings to identify individual stone units. Orient markings on vertical panels so that they are right side up when units are installed.
- D. Deliver sealants to Project site in original unopened containers labeled with manufacturer's name, product name and designation, color, expiration period, pot life, curing time, and mixing instructions for multi-component materials.
- E. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- F. Store aggregates in locations where grading and other required characteristics can be maintained and where contamination can be avoided.

1.5 PROJECT CONDITIONS

- A. Protect dimension stone cladding during erection as follows:
 - 1. Cover tops of dimension stone cladding installation with non-staining, waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down sides and hold securely in place.
 - 2. Prevent staining of stone from mortar, grout, sealants, and other sources. Immediately remove such materials without damaging stone.
 - 3. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
 - 4. Protect sills, ledges, and projections from mortar and sealant droppings.
- B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Remove and replace dimension stone cladding damaged by frost or freezing conditions.
 - 1. Comply with cold-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.
 - 2. Cold-Weather Construction: When ambient temperature is within limits indicated, use the following procedures:



- a. At 40 deg F and below, produce mortar temperatures between 40 and 120 deg F by heating mixing water, sand, or both. In heating mortar materials, maintain mixing temperatures within 10 deg F; do not heat water to above 160 deg F. Maintain temperature of mortar on boards above freezing. Do not apply mortar to stone units or substrates below 32 deg F.
 - b. Heat stone and substrates so they are above 32 deg F at time of installation.
 - c. At 25 to 20 deg F, heat both sides of walls under construction. Use windbreaks or enclosures when wind velocity exceeds 15 mph.
 - d. At 20 deg F and below, provide enclosure and auxiliary heat to maintain air temperature above 32 deg F within enclosure. Heat stone so it is above 40 deg F at time of installation.
3. Cold-Weather Protection: When mean daily temperature is within limits indicated, provide the following protection for 48 hours after construction:
- a. 40 to 25 Deg : Cover dimension stone cladding with a weather-resistant membrane.
 - b. 25 to 20 Deg F: Cover dimension stone cladding with weather-resistant, insulating blankets or provide enclosure and heat to maintain air temperature above 32 deg F within enclosure. Use windbreaks or enclosures when wind velocity exceeds 15 mph.
 - c. 20 Deg F (Minus 7 Deg C) and below: Provide enclosure and heat to maintain air temperature above 32 deg F within enclosure.
- C. Hot-Weather Requirements: Comply with hot-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.
- D. Environmental Limitations for Sealants: Do not install sealants when ambient and substrate temperatures are outside limits permitted by sealant manufacturer or below 40 deg F or when joint substrates are wet.

1.6 COORDINATION

- A. Coordinate installation of inserts that are to be embedded in concrete or masonry to be used by dimension stone cladding Installer for anchoring, supporting, and flashing of dimension stone cladding system. Furnish setting drawings, templates, and directions for installing such items and deliver to Project site in time for installation.
- B. Time delivery and installation of dimension stone cladding to avoid extended on-site storage and to coordinate with work adjacent to dimension stone cladding.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Dimension Stone Units: Furnish 12 finished stone panels 24"x24" for each finish and variety of stone specified.



PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Fabricate and install stonework to withstand normal loads from seismic forces, gravity, movement of building structure, and thermally induced movement, as well as to resist deterioration under normal use without failure. Design stone anchors and anchoring systems according to ASTM C 1242.
- B. Structural Performance: Provide dimension stone cladding system capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Wind Loads: Determine loads based on the following minimum design wind pressures:
 - a. Uniform pressure of 30 lbf/sq. ft. acting inward or outward.
- C. Safety Factors for Stone: Design dimension stone cladding system to withstand loads indicated without exceeding allowable working stress of stone determined by dividing stone's average ultimate strength, as established by testing, by the following safety factors:
 - 1. Safety Factor for Granite: 5.
- D. Provide stone anchoring system which will sustain the following forces generated by the supported element (individual member or assembly) acting separately, based on the yield strength of the material:
 - 1. A total force of 4 times the dead weight of the element supported, applied downward through the element's center of gravity, combined with loads caused by thermal movements.
 - 2. A total force of 2 times the dead weight of the element applied horizontally outward through the center of gravity of the element, combined with loads caused by thermal movements.
- E. Design stone anchors to withstand loads indicated without exceeding allowable working stresses established by the following:
 - 1. For Cold-Formed Stainless Steel: ASCE 8, "Specification for the Design of Cold-Formed Stainless Steel Structural Members."
 - 2. For Cast-in-Place and Postinstalled Fasteners in Concrete: One-fourth of tested capacity when installed in concrete with compressive strength indicated.
- F. Provisions for Fabrication and Erection Tolerances: Allow for fabrication and erection tolerances of building's structural system. Concrete fabrication and erection tolerances are specified in Division 3 Sections "Cast-in-Place Structural Concrete" and "Architectural Cast-in-Place Concrete."

2.2 GRANITE

- A. Granite: Comply with ASTM C 615 and NBGQU's "Specifications for Architectural Granite," Building Code of the City of New York and as follows.
 - 1. Basis-of-Design Products: The design for stone cladding systems is based on Charcoal Black, honed finish, thickness as indicated, as supplied by Cold Spring Granite.



- B. Approved manufacturers:
 - 1. Cold Spring Granite, Cold Spring, MN
 - 2. Dakota Granite, Milbank, SD
 - 3. North Carolina Granite Corporation, Mount Airy, NC
 - 4. Or approved equal
- C. Description: Uniform, medium-grained, dark gray stone.
- D. Cut: Vein cut.
 - 1. Orientation of Veining: Horizontal
- E. Cut stone from one block or contiguous, matched blocks in which natural markings occur.
- F. Finish: Honed.
- G. Match Architect's samples for color, finish, and other stone characteristics relating to aesthetic effects.
- H. Thickness: Not less than 1 inches, unless otherwise indicated.

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Low-Alkali Cement: Portland cement for use with limestone shall contain not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
- D. Colored Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III; hydrated lime complying with ASTM C 207; and mortar pigments. Use a mix of formulation required to produce color indicated or, if not indicated, as selected from manufacturer's standard formulations. Pigments shall not exceed 10 percent of portland cement by weight.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Essroc, Italcementi Group;
 - b. Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
 - c. Lafarge North America Inc.; Eaglebond.
 - d. Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.



- E. Aggregate: ASTM C 144; use aggregate graded with 100 percent passing No. 16 sieve.
1. White Aggregates: Natural white sand or ground white stone.
 2. Colored Aggregates: Natural-colored sand or ground marble, granite, or other durable stone; of color necessary to produce required mortar color.
- F. Mortar Pigments: Natural and synthetic iron oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in mortar and containing no carbon black.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bayer, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
 - b. Davis Colors; True Tone Mortar Colors.
 - c. Solomon Colors; SGS Mortar Colors.
- G. Water: Potable.

2.4 ANCHORS AND FASTENERS

- A. General: Provide anchors, angles, shims and attachments of type and size required to support stonework and fabricated from the following metals for conditions and anchors indicated.
1. All stone panel support and anchors shall be independently supported panels and shall not transfer loads to another or any adjacent panel.
- B. Fabricate anchors from stainless steel, ASTM A 666, Type 304, temper as required to support loads imposed without exceeding allowable design stresses. Fabricate dowels and pins for anchors from stainless steel, ASTM A 276, Type 304
- C. Cast-in-Place Concrete Inserts: Steel, cast iron, or malleable iron adjustable inserts, with bolts, nuts, washers, and shims; all hot-dip galvanized or mechanically zinc coated, with capability to sustain, without failure, a load equal to 4 times the loads imposed as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- D. Postinstalled Anchor Bolts for Concrete and Masonry: Chemical anchors made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

2.5 STONE ACCESSORIES

- A. Setting Shims: Strips of resilient plastic or vulcanized neoprene, Type A Shore durometer hardness of 50 to 70, non-staining to stone, of thickness needed to prevent point loading of stone on anchors and of depths to suit anchors without intruding into required depths of pointing materials.



- B. Setting Buttons: Lead or resilient plastic buttons, non-staining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of pointing materials, joint sealants or causing third-side adhesion between sealant and setting button.
 - 1. Setting buttons shall be of sufficient durometer hardness to maintain joint widths indicated.
- C. Cementitious Dampproofing: Provide cementitious formulations that are recommended by ILI and that are non-staining to stone, compatible with joint sealants, and noncorrosive to anchors and attachments.
- D. Sealant Products: Provide manufacturer's standard chemically curing, elastomeric sealants that are compatible with stone type, joint fillers, joint substrates, and other related materials and comply with requirements of Division 7 Section "Joint Sealants" for products corresponding to those indicated below:
 - 1. Sealant for Joints in Surfaces of Dimension Stonework:
 - a. Two-part nonsag silicone sealant formulated especially for granite; provide primer for all sealant joints.
 - 2. Colors: As selected by Architect.

2.6 STONE FABRICATION

- A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated, including details on drawings and shop drawings.
 - 1. For granite, comply with recommendations in NBGQA's "Specifications for Architectural Granite."
- B. Dress joints (bed and vertical) straight and at right angle to face, unless otherwise indicated. Shape beds to fit supports.
- C. Cut and drill sinkages and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone securely in place.
- D. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.
 - 1. Cut stones to produce pieces of thickness, size and shape indicated or required and within fabrication tolerances recommended by applicable stone association. Thickness of Exterior Stonework: Provide thickness indicated but not less than 1" thick.
 - 2. Dress joints (bed and vertical) straight and at 90 degree angle to face, unless otherwise indicated. Width; Height; Out of Square; Exposed face flatness; plus or minus 1/16 inch; Cut outs for anchors, kerfs, supports or etc. shall not be greater than 1/3 (width of opening) the total designated minimum thickness of the stone panel.
 - 3. Cut stones to produce joints of uniform width and in locations indicated.
 - a. Joint Width: 1/4 inch.
 - 4. Clean backs of stones to remove stains and free particles.
- E. Contiguous Work: Provide chases, reveals, reglets, openings, and similar features as required to accommodate contiguous work.
- F. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.



1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved samples and mockups.

2.7 MORTAR MIXES

- A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortar of uniform quality and with optimum performance characteristics.
 1. Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. Do not use calcium chloride.
 2. Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer, unless otherwise indicated. Discard mortar when it has reached initial set.
- B. Portland Cement-Lime Setting Mortar: Comply with ASTM C 270, Proportion Specification, for types of mortar indicated below:
 1. Set granite with Type S mortar.
- C. Pointing Mortar: Comply with ASTM C 270, Proportion Specification, for types of mortar indicated. Provide pointing mortar mixed to match Architect's sample and complying with the following:
 1. Pigmented Pointing Mortar: Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ratio of 1:10, by weight.
 2. Packaged Portland Cement-Lime Mix Mortar: Use portland cement-lime mix of selected color.
 3. Colored-Aggregate Pointing Mortar: Produce color required by combining colored aggregates with portland cement of selected color.
 4. Point granite with Type S mortar.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive dimension stone cladding and conditions under which dimension stone cladding will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of dimension stone cladding.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.



3.2 SETTING DIMENSION STONE CLADDING, GENERAL

- A. Before setting stone clean surfaces that are dirty or stained by removing soil, stains, and foreign materials. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
- B. Execute dimension stone cladding installation by skilled mechanics and employ skilled stone fitters at Project site to do necessary field cutting as stone is set.
 - 1. Use power saws with diamond blades to cut stone. Produce lines cut straight and true, with edges eased slightly to prevent snipping.
- C. Set stone to comply with requirements indicated on drawings and shop drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure dimension stone cladding in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.
- D. Construction Tolerances: Set stones to comply with the following maximum tolerances:
 - 1. Variation from Level: 1/8 inch in 20 feet or more.
 - 2. Variation in Surface Flatness: Plus or minus 1/16 inch as determined by a 4 foot straight edge. Variation shall be as indicated or 1/3 of the indicated joint width, whichever is greater.
 - 3. Variation in Joint Width: Plus or minus 1/16 inch.
 - 4. Variation in Plane between Adjacent Stone Units (Lipping): Do not exceed 1/16-inch difference between planes of adjacent units.
- E. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.
 - 1. Sealing expansion and other joints is specified in Division 7 Section "Joint Sealants."
 - 2. Keep expansion joints free of mortar and other rigid materials.

3.3 SETTING MECHANICALLY ANCHORED DIMENSION STONE CLADDING

- A. Attach anchors securely to stone and to backup surfaces. Comply with recommendations in ASTM C 1242.
- B. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes and kerfs with sealant indicated for filling kerfs.
- C. Set stone supported on clips or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths and to prevent point loading of stone on anchors. Hold shims back from face of stone a distance at least equal to width of joint.

3.4 SETTING DIMENSION STONE CLADDING WITH MORTAR

- A. Set stone in full bed of mortar with head joints filled, unless otherwise indicated.



1. Use setting buttons of adequate size, in sufficient quantity, and of thickness required to maintain uniform joint width and to prevent mortar from extruding. Hold buttons back from face of stone a distance at least equal to width of joint, but not less than depth of pointing materials.
 2. Do not set heavy units or projecting courses until mortar in courses below has hardened enough to resist being squeezed out of joint.
 3. Support and brace projecting stones until wall above is in place and mortar has set.
 4. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes and kerfs with mortar.
- B. Fill space between back of stone units and backup wall solidly with mortar or grout.
 - C. Embed ends of sills in mortar; leave remainder of joint open until final pointing.
 - D. Rake out joints for pointing with mortar to depths of not less than 1/2 inch. Rake joints to uniform depths with square bottoms and clean sides.
 - E. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply first layer of pointing mortar in layers not more than 3/8 inch until a uniform depth is formed.
 - F. Point stone joints by placing pointing mortar in layers not more than 3/8 inch. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
 - G. Tool joints with a round jointer having a diameter 1/8 inch larger than width of joint, when pointing mortar is thumbprint hard.
 - H. Rake out mortar from sealant-pointed joints to depths of not less than 1/2 inch nor less than that required for sealant and sealant backing. Rake joints to uniform depths with square bottoms and clean sides.
 - I. Set dimension stone cladding with unfilled head joints for installing joint sealants:

3.5 JOINT-SEALANT INSTALLATION

- A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Division 7 Section "Joint Sealants."

3.6 FIELD QUALITY CONTROL

- A. Field Testing Service: The City of New York will employ and pay a qualified independent testing laboratory to perform field quality control testing.
- B. Test stone for compliance with physical property requirements of referenced ASTM standard specifications. Conduct tests using specimens randomly selected from, and representative of, installed stonework.
- C. Report test results in writing and in form specified under ASTM test method, to the Commissioner on same day tests are made.



3.7 ADJUSTING AND CLEANING

- A. Remove and replace broken, chipped, stained, or otherwise damaged stone, defective joints, and dimension stone cladding that does not match approved samples and mockups. Damaged stone may be repaired if Commissioner approves methods and results.
- B. Replace in a manner that results in dimension stone cladding's matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean dimension stone cladding as work progresses. Remove excess sealant and smears as sealant is installed.
- D. Final Cleaning: Clean dimension stone cladding no fewer than six days after completion of pointing and sealing, using clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage stone.

3.8 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to Fabricator and Installer ensure dimension stonework's being without damage or deterioration at time of Substantial Completion.

END OF SECTION 04851



SECTION 10522 – FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Provide fire extinguishers in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Fire extinguishers
2. Mounting brackets

B. Related Sections:

1. Division 6, Section "Rough Carpentry"

1.2 SUBMITTALS

A. Product Data: Submit product data for each type of product specified. Include roughing-in dimensions and details showing mounting methods.

1. Locate fire extinguishers in accordance to NYC Fire Code requirements, provide schedule indicating type and proposed locations.
2. Provide mounting type as selected by the Commissioner.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain fire extinguishers from one source from a single manufacturer.

B. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL Listing Mark for type, rating, and classification of extinguisher indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products of Larsen's Manufacturing Co, or an approved equal of one of the following:

1. Allenco
2. J.L. Industries Larsen's Manufacturing Co.
3. Potter-Roemer, Inc.

2.2 FIRE EXTINGUISHERS

A. General: Provide fire extinguishers selected by the Commissioner which comply with requirements of governing authorities.



1. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer's requirements.
 2. Abbreviations below identify extinguishers by UL classification and rating system and not, necessarily to type and amount of extinguishing material in extinguisher.
- B. Multi-Purpose Dry Chemical Type: UL Rated 3A:40-B:C, 20 lb. nominal capacity, in enameled steel container for Class A, Class B and Class C fires.
- 2.3 BRACKET FOR WALL-MOUNTED EXTINGUISHERS
- A. Construction: Heavy gauge steel.
 - B. Size: Appropriate to extinguisher.
 - C. Finish: Provide manufacturer's standard factory applied baked enamel finish.
 - D. Model: Provide wall mounted bracket for use with fire extinguisher selected or specified as manufactured by Larsen's Manufacturing Co, or equal from other approved manufacturers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for thickness and framing for cabinets to verify mounting prior to installation.

3.2 INSTALLATION

- A. Follow manufacturer's printed instruction for installation.
- B. Install items of this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
 1. Instructions. Report to the Commissioner in writing any unsatisfactory conditions and do not proceed with installation until such conditions have been corrected.
- C. Provide fabrication and installation that complies with New York State and Local Building Codes, ADA requirements and other authorities having jurisdiction.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust cabinet doors that do not swing or operate freely. Refinish or replace cabinets and doors damaged during installation.
- B. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 10522





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - General Construction

Project: Spring Street Salt Shed

Location: 553 Canal Street, New York NY 10013

Bidder:

DDC ID: S195-227S

Sponsor Agency: Dept of Sanitation

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
03411	Precast Concrete Hollow Core Planks		SF					
	Scaffolding		SF					
	Precast Concrete Panels 6" thick supply only		EA					
	Install and support pre-cast plank							
	Subtotal							
Division 4	MASONRY							
04851	Masonry/ Stone		SF					
	Granite stone 1" thick at sidewalk level at exterior wall							
	Subtotal							
Division 5	METALS							
05120	Structural Steel		TON					
	Roof Plate Girders (PG1 - PG5, W18)		TON					
	Connections (10%)							
	Subtotal							
05500	Metal Fabrications		TON					
	Pre-cast panel support (tube/anchors/welding)		LS					
	Misc Framing at Openings		LF					
	Stain Steel roof cable rails		SF					
	Catwalk at roof level		EA					
	12" Bollard - Concrete filled steel pipe							
	Subtotal							
05510	Exterior Metal Stairs (Included w/ 05500)							
05532	Stainless Steel Floor Grating and Plate		LS					
	Stainless Steel Enclosure for the electrical panel (A-304/A-403)		SF					
	Stainless Steel Canopy @ Electrical Panels (2 loc)		SF					
	Add 1" Thick, 8' High Corten Plates @ Interior Perimeter(Supply \$1.5per/lbs)							
	Subtotal							





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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
Division 8	DOORS AND WINDOWS							
08331	Overhead Coiling Doors							
	SS frame type 316 around opening for the door		LF					
	Roll Up Door Stainless Steel 31'x21' (McKeon Door)		SF					
	Add for increase the size of the door to 24' wide		SF					
	Subtotal							
08391	Flood Barriers							
	Flood Gate (A-601)		LS					
	Subtotal							
08620	Unit Skylights							
	Unit Skylight - Typical		EA					
	Subtotal							
Division 9	FINISHES							
09960	High Performance Coating							
	Painting of exposed structural steel		SF					
	Scaffolding/scissor lift		LS					
	Subtotal							
Division 10	SPECIALTIES							
10522	Fire Extinguishers							
	Fire Extinguishers		EA					
	Subtotal							
Division 13	SPECIAL CONSTRUCTION							
13210	Underground Storage Tanks							
	Rainwater Collection Tank							
	Excavation		CY					
	Carting		CY					
	Concrete Foundation Mat - 3'6" Thick		CY					
	Concrete Walls - 1' 6" Thick		CY					
	Formwork		SF					
	Reinforcement		TONS					





THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

September 27, 2013

ADDENDUM No. # 3

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

S195-227S

Spring Street Salt Shed Construction

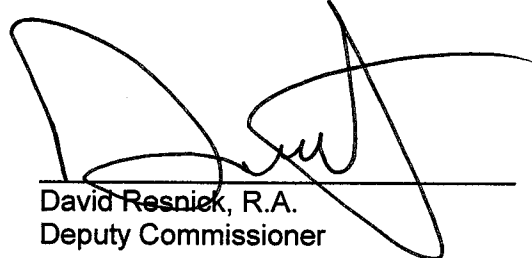
This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **Questions from Bidders and Responses to Questions:**
See Attachment A.
2. **Revisions to the Specifications:**
See Attachment B.
3. **Revisions to the Drawings:**
See Attachment C.
4. **Revisions to the Addendum to the General Conditions:**
See Attachment D.
5. **Revisions to the Bid Booklet:**
Delete page 6 and replace with 6R, included with this Addendum.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.
Deputy Commissioner

Name of Bidder

By: _____



DDC PROJECT #: S195-227S

PROJECT NAME: Spring Street Salt Shed Construction

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	<p>On Page 3 of UST specification section #13210, pumps are called out at 3/208V, but the panel is 1/120V. Which is correct? You cannot mix the two; they have to be compatible. Please clarify.</p>	<p>The pump and pump control panel are to be 208 Volt, three phase, 4-wire. The controls WITHIN the pump control panel will operate on 120 Volt power derived from one leg of the 208 Volt circuit and the neutral. Please reference the feeder key "B" on the single line diagram that indicates that the panel is to be fed with 4-#10 conductors with 1-#10 ground, indicating a three phase, 4-wire circuit.</p>
2	<p>Due to highly specialized scope for work including the drilled caissons and architectural self consolidating concrete frame, we respectfully request that the requirement that the provision, for sub-contracts not to exceed 60% of the contract, be deleted.</p>	<p>The provision for "sub-contracts not to exceed percent of contract price" is hereby increased to 80% from the originally specified 60%. See the revised Schedule A in Attachment B of this Addendum.</p>
3	<p>Drawing A-102.00, Glass Pavers – Please supply a drawing with increased detail. After speaking with the specified manufacturer these glass pavers cannot be cut in the field. We need drawings with dimensions from joint to joint including the block-outs for the drains and lights so that the material can be quoted accurately.</p>	<p>See revised drawing A-102.00. The design intent is to provide 1'x3' pavers staggered pattern. Upon approval of required shop drawing alternate layouts may be acceptable.</p>
4	<p>With reference to Specification Section 02745 and "Textured Laminated Mirror Backed Cast Glass Paving" indicated in the Architectural Plans (see drawings A-102.00 & A-301.00), what size pavers will be required? Are out-of-square edges and variation in the widths of paved surfaces to be accommodated by cutting pavers or custom casting pavers?</p>	<p>As indicated in specification section 02745 section 1.1 - A.-1 all pavers are custom cast laminated tempered glass pavers. This type of glass paver cannot be cut in the field. It is expected that this product will be entirely custom cast for this project including out of square edges (at corners, light fixtures, trench drains, etc.).</p>
5	<p>Vertical Joints in Form Lining: Please clarify the requirements for joint locations in the exterior wall form plywood liner: <i>Specification Section 03330, Section 2.03 Formwork Materials, Item A.4 Shop built plywood liner units</i>, states that plywood panels should cover areas "...between joint lines shown on the drawings."</p> <p>The statement in <i>Specification Section 03330, Section 3.02 Formwork, Item B.3 Formwork Erection Vertical and Horizontal Control Joints</i>, while requiring joint locations to be approve, seems to require only horizontal construction joints to be on lines shown in the plans? That is, can standard width plywood panels be used as form lining with their vertical joint falling where they will?</p>	<p>Horizontal and vertical control joint and construction joint locations are required to be approved as required by specification and indicated on drawings. The location of form joints does not require approval, however formwork shop drawings are required to show the form system and specific details of its fabrication and use pertaining to achieving the required concrete surface.</p> <p>The vertical construction joints on the sectional plans shown on drawings S-113.00, S-114.00, S-115.00, and S-116.00 shall be revised as typically shown on drawing S-111.00 with keyed vertical construction joints at 24'-0" O.C. and control joints at 8'-0" O.C. between vertical construction joints. The Typical Concrete Wall Joints Detail 1/S-111 applies to all exterior salt shed walls.</p>



6	<p>Detail for Exterior Granite Trim at Base of Wall: Is it acceptable to modify the detail for the granite trim (see 9/S-402.00) so that it can be installed after the paving and trench drain work are completed? The granite would extend only ½" below the top of the drain. The top of the compressible filler would be at the bottom-of-granite and a high-performance sealant would be installed between the granite and the drain structure at the top of the filler. The space of the below-grade granite shown in the detail would be filled with concrete as part of the foundation structure.</p>	<p>This may be acceptable pending the approval of dimensional stone submittals shop drawings.</p>
7	<p>The 200T compression mini-caissons have a 100T tension requirement. A 75ksi #18 bar does not cover the 100T tension, a #20 bar would. Please advise.</p>	<p>The required design uplift for the 200-ton caisson shall be 80 tons (not 100 tons). The 75ksi #18 bar covers the 80 ton requirement. See revised drawing FO-100.</p>
8	<p>The FO-100 drawing refers to the structural drawings for the size of the plate at the top of the mini-caissons. No information is shown on the structural drawings. Please advise.</p>	<p>The anchor plate detail for the caissons referenced on FO-100 are shown in detail 9/S-004.00 and detail 10/S-004.00.</p>
9	<p>We have downloaded documents for Addendum #2; however we cannot open either the CAD files or the Revit file <i>Revit Model Drawings</i>. We do not have the software for these programs. Please upload documents that we can open, view and print.</p>	<p>At the request of bidders (Question 4, Attachment A in Addendum #2) the CAD files of the original Bid Set drawings have been provided for convenience. These files are the electronic version of information previously released in the form of Bid Documents on DDC's website, released in PDF format. Therefore this information has already been issued in a format that can be opened, viewed and printed. Note that DDC does not provide bidders, contractors or consultants with software necessary to perform their work; that is the sole responsibility of the bidder, contractor or consultant party.</p>
10	<p>Addendum #2 consists of "Architectural Bid Set Model, RVT file", we cannot open it. Please provide in PDF format.</p>	<p>At the request of bidders (Question 1, Attachment A in Addendum #2) the Revit model used to create the architectural Bid Set drawings has been provided for convenience. These files are the electronic version of information previously released in the form of Bid Documents on DDC's website, released in PDF format. Therefore this information has already been issued in a format that can be opened, viewed and printed. Note that DDC does not provide bidders, contractors or consultants with software necessary to perform their work; that is the sole responsibility of the bidder, contractor or consultant party.</p>



11	We cannot find an elevation drawing detail that defines the invert of elevation of the 12" storm sewer pipe relative to the sanitary combined pipe on Spring Street. What is the depth of this pipe starting from the yard out to the street for excavation purposes? Please advise.	Refer to Contract Drawing C-106.00: The inlet invert elevation of connection of 12" ST at City Sewer 4' x 2'10" is 0.40, Outlet Invert Elevation of 12" ST at SMH-02 is at 1.63. Refer to drawing C-101.00- Grade Elevation of SMH-02 is at 5.60. Refer to Survey by Maitra Associates PC dated 11-15-2008 included in the Contract Drawing: Grade at the point of connection of sewer is approximately at 5.30. Depth to the invert of the pipe hence ranges from 3.97 ft to 4.9 ft approximately.
12	Drawing A-102.00 calls for a 6" continuous trench drain at building base and drawing C-101.00 calls for a 4" continuous trench drain along shed walls. Please clarify the correct dimension for the continuous trench drain to be used at outside perimeter of building walls.	The continuous trench drain at the building base is 4" internal width as shown on drawings C-101.00 and C-102.00.
13	Please provide location and structural drawing number for the calcium chloride tank wall.	The calcium chloride tank wall location can be found on S-110.00 and 2/A-402.00. The structural drawing for the calcium chloride tank wall can be found on 2/S-402.00.
14	Please provide the written Geotechnical Investigation Report stating the record of borings and whether hazardous or non-hazardous substances are present.	The Geotechnical Report prepared by Camp Dresser and McKee was provided in Volume 3 with the technical specifications.
15	The Bid Breakdown (Section #02771) calls for 12" porous fill under site 36" slab on grade, however, drawing S-302.00 shows 10" compacted #57 stone. Please verify which is correct.	The 10" thick compacted #57 stone under the 36" base slab and 2" concrete workmat as shown on drawing S-302.00 is correct.
16	The Bid Breakdown (Section #03300) calls for 12" porous fill under 42" mat slab, however, drawing S-302 shows 6" compacted #57 stone. Please verify which is correct.	The 6" thick compacted #57 stone under the 40" base slab and 2" concrete workmat as shown on drawing S-302.00 is correct.
17	The Bid Breakdown (Section #03350) calls for welded wire mesh - 6x6 - W4.0 x W4.0, however, drawing S-305.00 shows 6x6 - W7.5 x W7.5. Please verify which is correct.	The W.W.F. 6x6 - W7.5xW7.5 shown on drawing S-305.00 is correct.
18	Drawing L-101.00 calls for replacement of the Granite Curb, however, there is no item for this on the Bid Breakdown. Please advise.	See <i>Instructions for Preparing Bid Breakdown, item (D)</i> on page 21 of the Bid Booklet, for instructions on how to add an item, when the item is not included in the Bid Breakdown, but is included in the Contract Documents.
19	Drawing C-103.00, Curb Note "A" states that a granite curb will be used for the sidewalk replacement at Canal Street, however, Drawing L-201.00 states that Steel faced curb is to be used at Canal Street. Please clarify where granite curb is to be used and where steel curb is to be used.	Drawing C-103.00, Curb Note "A" is correct.



20	Some articles in the specifications state that the inspection of pile installations is by the Owner's representative and others state that contractor is responsible. Please clarify.	All Special Inspections during the caissons' installation should be performed by an Engineer retained by the City of New York, who will be responsible for signing the DOB TR-1 forms. Installation Records shall be performed by an Engineer retained by the City of New York. The contractor should provide all equipment, including the down-the-hole video camera (and the operator) for the inspection of the rock sockets and is responsible for any other required inspections.
21	Some articles in the specifications state that the load test inspection and report are by Owner's representative and others state that contractor is responsible. Please clarify.	Observations and report during the lateral load tests should be performed by an Engineer retained by the City of New York. The contractor should provide all equipment (and operators) required to conduct the testing.
22	Hazardous Materials in Area of Building Demolition: Will the demolition contract include removal of all hazardous materials, especially lead and asbestos, from the site so that no testing or cleanup will be required during construction.	The existing M1 Garage demolition contract includes provisions for asbestos abatement, hazardous materials, contaminated soils and industrial waste removals. The intent is to leave a clean site upon completion of the demolition project. If contaminated or hazardous materials are encountered on site during construction of the new Salt Shed the successful bidder will be responsible to follow all applicable codes and regulations to address and correct the condition.
23	Please verify that demolition of the existing structure, removal of foundations, and installation of suitable compacted backfill is by others.	Yes, the existing M1 Garage demolition contract includes removal of existing structure, including what are anticipated to be spread footings, back-filled in accordance with the requirements of the Building Code of the City of New York.
24	Underground Tank: Please confirm that there is a single underground tank, the 6,000 gallon rainwater tank, to be included in the contract. The specifications in at least one location (<i>Specification Section 02470, Paragraph 1.10 Project Conditions Item B</i>) mention more than one tank.	Confirmed.
25	It would be very difficult to put voids in the 6" wet cast slabs. A 6" solid would weight 75 lb/sf rather than 45 lb/sf. Would this be an acceptable replacement? Will the structure be okay with the extra weight?	It is assumed the contractor is referring to the 6" precast hollow core roof planks. The specified precast hollow core plank is an item that is standard in the precast industry and it is required for this project.
26	Please advise what type of piping is to be used above ground.	See "Interior and Exposed Piping" schedule on page 3 of specification section 15120. Cast Iron Soil Pipe, with bituminous coating at the interior and asphalt coating at the exterior, bell and spigot joints, test pressure 5 psig, service weight.
27	Will the award of the 2 nd tier subcontractors (subcontractors of our subcontractor) be included in the attainment of the participation?	No, only 1 st tier subcontractors can fulfill the MWBE participation requirements.



28	Can the Bid Breakdown form be submitted 72 hours after the bid date, due to its complexity and the amount of detail required?	Refer to page 2 of the Bid Booklet in Volume 1 for instruction.
29	Regarding the Glass Pavers: Please provide a detail showing the composition of layers of the glass pavers. The information provided is very vague. It shows two layers of glass bonded with a polyvinyl butyral interlayer, but the layers are uncertain.	<p><i>Specification Section 02745 Part 2.2-B</i> indicates the glass pavers shall be "two planks of double-strength, clear glass; Type I, Class 1, quality q3; permanently laminated together with minimum 0.030" thick sheet of plasticized polyvinyl butyral, which has been produced specifically for laminating glass."</p> <p><i>Part 2.2-C</i> continues "Custom Cast Laminated Glass Pavers: Provide transparent laminated, tempered cast glass planks with heavily textured top surfaces made by fusing together two solid slabs of clear, colorless glass with manufacturer's standard clear-colored translucent, polyvinyl-butyr-al-based coating factory applied on edge surfaces complying with the following requirements for pattern, size, and other characteristics:"</p> <p><i>Part 2.1-A</i> provides loading performance requirements, with engineering design by contractor.</p>
30	The project description references two (2) 5,000 gallon liquid calcium chloride tanks. These tanks are not shown in the drawings or specifications. Will the drawings be revised and specifications added?	See Addendum #2, Attachment A, Question 10.
31	<p>Door Jamb Construction: The structure of the stainless steel door jamb and head are different on Architectural Drawing (5/A-601.00) and Structural Drawing (8/S-307.00), in that the Architectural Plans suggest that the steel is bolted into place after the walls are cast and the Structural Plans have the steel in place when the wall is poured anchored by welded studs. We suggest that it is best to bolt the steel onto the walls with drilled anchors so that replacement would be simpler. We also suggest that the profile of the concrete at the jambs should be constant over their full height; it appears in the plans that the profile may change for the south jamb between El. 30'-5" (S-113) and El. 38'-5" (S-114). Is it acceptable to carry the wall layout at the jambs unchanged to the top of the opening?</p>	<p>Installation of stainless steel door jamb cast with concrete with use of welded studs as shown on Structural Drawing (8/S-307.00) or installed on concrete with use of two 1/2" diameter 3 1/2" long stainless steel flat head expansion anchors at 16" vertical/overhead spacing as shown on the Architectural Drawings (3 & 5 / A-601.00) are both acceptable. In both methods the anchors/studs shall be a minimum of 6" from any edge of concrete.</p> <p>The jamb surround shall wrap the interior and exterior of the jamb, and extend past the respective corners, for 6" parallel to the face of the concrete wall. The profile of the concrete at the jambs shall be plumb and constant over the full height of the opening and the door head (see Architectural Drawing 2/A-304.00). As the protective steel jamb wraps the corner to the concrete walls' interior or exterior faces, each angle created at the respective corner, between the steel at the jamb and that 6" steel extension, will be unique and should follow the form of the concrete.</p> <p>The pocket provided for the flood gate shall be coordinated with the manufacturer. Typical manufacturer details provide for a steel channel with integral gaskets into which the panels are lowered forming a watertight seal. We do not expect additional steel will be required to line the flood gate assembly recess, however final shop drawing coordination must be completed with the manufacturer for approval.</p>



32	Bid Breakdown form page 21-8R Section 08331 indicates a roll up stainless steel door 31' x 21'. Drawing A-601.00 indicates 25' x 34'. Which prevails? Please clarify.	The overhead coiling door shall be 25' x 34' as indicated on drawing A-601.00.
33	The Addendum #2 electronic drawings appear to be the same as the original PDF Bid Set drawings, but have a "modified date" of 9/16/13. The original drawings have a modified date of 8/23/13. There is no mention of any drawing changes in the Addendum #2 narrative. Are there any changes to the drawings issued on the DDC website as part of Addendum #2?	There are no changes or differences between the electronic drawings issued as part of Addendum #2 and the Bid Set documents released by DDC on August 26, 2013. The Addendum #2 electronic file "modified date" of 9/16/13, viewed under the electronic file's <i>Properties</i> tab, refers to the date that the Addendum #2-issued electronic files were created (copied) from the original Bid Set electronic files. The original Bid Set drawings 8/23/13 date, viewed under that electronic file's <i>Properties</i> tab, again refers to the file's creation date.



DDC PROJECT #: S195-227S

PROJECT NAME: Spring Street Salt Shed Construction

ATTACHMENT B – REVISIONS TO THE SPECIFICATIONS

1. Refer to Specification Section 03300 Cast-in-Place Structural Concrete

Section 2.1.B, add the following to schedule:

Item	Concrete Class	28-day Minimum Design Strength (f'_c)
Concrete Workmat	Class 25	2,500 psi

2. Refer to Specification Section 02745 Cast Laminated Glass Pavers

Section 1.2 C, add the following:

- C. Shop Drawings: Submit layout plans indicating paver patterns, sizes, profiles, coursing, locations of special shapes, width of joints, and attachments to other work. Submit installation details for cast laminated glass pavers.



DDC PROJECT #: S195-227S

PROJECT NAME: Spring Street Salt Shed Construction

ATTACHMENT C – REVISIONS TO THE DRAWINGS

1. **REFER TO DRAWING A-102.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Note for fire extinguisher revised to "CLASS A;B;C TYPE 20LB FIRE EXTINGUISHERS"
2. **REFER TO DRAWING A-402.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Revised trench drain detail, coordinated with civil drawings.
3. **REFER TO DRAWING C-001.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Added note 9 to General Notes.
4. **REFER TO DRAWING C-101.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Added hatch to plan indicating replacement of pavement at areas of new curb and sidewalk.
Added note 8 stating replacement of pavement at areas of new curb and sidewalk.
5. **REFER TO DRAWING C-102.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Added hatch to plan indicating replacement of pavement at areas of new curb and sidewalk.
6. **REFER TO DRAWING C-103.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Added "Pavement Details" notes.
7. **REFER TO DRAWING C-104.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Revised pedestrian ramp details.
8. **REFER TO DRAWING C-105.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Revised trench drain details, coordinated with architectural drawings.
9. **REFER TO DRAWING FO-100.00** (Revised and included with this Addendum)
CAD file available for download on DDC website or pick up at DDC office.
Revised uplift for the 200-ton caisson to 80 tons.
10. **REFER TO DRAWING C-106.00**
No revision - CAD file available for download on DDC website or pick up at DDC office.
11. **REFER TO DRAWING L-101.00**
No revision - CAD file available for download on DDC website or pick up at DDC office.
12. **REFER TO DRAWING L-201.00**
No revision - CAD file available for download on DDC website or pick up at DDC office.
13. **REFER TO DRAWING S-001.00**
No revision - CAD file available for download on DDC website or pick up at DDC office.
14. **REFER TO DRAWING S-002.00**
No revision - CAD file available for download on DDC website or pick up at DDC office.



15. **REFER TO DRAWING S-003.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

16. **REFER TO DRAWING S-004.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

17. **REFER TO DRAWING S-005.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

18. **REFER TO DRAWING S-006.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

19. **REFER TO DRAWING S-101.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

20. **REFER TO DRAWING S-105.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

21. **REFER TO DRAWING S-110.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

22. **REFER TO DRAWING S-111.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

23. **REFER TO DRAWING S-112.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

24. **REFER TO DRAWING S-113.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

25. **REFER TO DRAWING S-114.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

26. **REFER TO DRAWING S-115.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

27. **REFER TO DRAWING S-116.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

28. **REFER TO DRAWING S-117.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

29. **REFER TO DRAWING S-118.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.



30. REFER TO DRAWING S-119.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

31. REFER TO DRAWING S-201.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

32. REFER TO DRAWING S-202.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

33. REFER TO DRAWING S-301.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

34. REFER TO DRAWING S-302.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

35. REFER TO DRAWING S-303.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

36. REFER TO DRAWING S-304.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

37. REFER TO DRAWING S-305.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

38. REFER TO DRAWING S-306.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

39. REFER TO DRAWING S-307.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

40. REFER TO DRAWING S-401.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

41. REFER TO DRAWING S-402.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

42. REFER TO DRAWING P-000.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

43. REFER TO DRAWING P-001.00

No revision - CAD file available for download on DDC website or pick up at DDC office.

44. REFER TO DRAWING P-100.00

No revision - CAD file available for download on DDC website or pick up at DDC office.



45. **REFER TO DRAWING P-101.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

46. **REFER TO DRAWING EL-101.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

47. **REFER TO DRAWING EL-102.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

48. **REFER TO DRAWING H-000.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

49. **REFER TO DRAWING H-100.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

50. **REFER TO DRAWING H-101.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

51. **REFER TO DRAWING E-001.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

52. **REFER TO DRAWING E-002.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

53. **REFER TO DRAWING E-003.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

54. **REFER TO DRAWING E-004.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.

55. **REFER TO DRAWING E-005.00**

No revision - CAD file available for download on DDC website or pick up at DDC office.



PDC PROJECT #: S195-227S

PROJECT NAME: Spring Street Salt Shed Construction

ATTACHMENT D – REVISIONS TO THE ADDENDUM TO THE GENERAL CONDITIONS

1. Refer to Page 1 of 26 of the Addendum to the General Conditions
Project Description is revised as per the following:

This Project consists of the construction of a new fully enclosed, cast-in-place concrete salt shed; gated service yard; lot line concrete protection and push walls. This facility shall be constructed on a drilled caisson foundation. The floor slab, service yard and drive shall be a structural concrete slab supported by drilled caissons. The building will have exterior walls of cast-in-place concrete and a precast concrete roof deck supported by steel plate girders. Work includes related site work, mechanical, plumbing, electrical and other items noted on the Contract Documents.

2. Refer to Page 9 of 26 of the Addendum to the General Conditions
Article 17 Contract revised as per the following:

REFERENCE	ITEM	REQUIREMENTS	CONTRACT FOR GENERAL CONSTRUCTION
Article 17 Contract	Sub- contracts	Not to exceed percent of Contract Price	80%



Tax ID #: _____

APT E-
PIN#: 85014B0016

Contract # 1 - General Construction Work

SCHEDULE B - M/WBE Utilization Plan

Part I: M/WBE Participation Goals

Part I to be completed by contracting agency

Contract Overview

APT E-Pin # 85014B0016 FMS Project ID#: S195-227S

Project Title/Agency Spring Street Salt Shed

PIN # 8502014TR0001C

Bid/Proposal
Response Date: October 9, 2013

Contracting Agency Department of Design and Construction

Agency Address 30-30 Thomson Avenue City Long Island City State NY Zip Code 11101

Contact Person James A. Cerasoli Title Deputy Director

Telephone # (718) 391-1549 Email CERASOLI@DDC.NYC.GOV

Project Description (attach additional pages if necessary)

This Project consists of the construction of a new fully enclosed, cast-in-place concrete salt shed; gated service yard; lot line concrete protection and push walls. This facility shall be constructed on a drilled caisson foundation. The floor slab, service yard and drive shall be a structural concrete slab supported by drilled caissons. The building will have exterior walls of cast-in-place concrete and a precast concrete roof deck supported by steel plate girders. Work includes related site work, mechanical, plumbing, electrical and other items noted on the Contract Documents.

M/WBE Participation Goals for Services

Enter the percentage amount for each group or for an unspecified goal.

Prime Contract Industry: Construction

Group	Percentage
<u>Unspecified</u>	<u>3 %</u>
or	
<u>Black American</u>	<u>UNSPECIFIED %</u>
<u>Hispanic American</u>	<u>UNSPECIFIED %</u>
<u>Asian American</u>	<u>UNSPECIFIED %</u>
<u>Women</u>	<u>UNSPECIFIED %</u>
Total Participation Goals	3 %

Line 1



THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

ADDENDUM TO THE GENERAL CONDITIONS

The General Conditions are hereby amended in accordance
with the terms and conditions set forth in this Addendum.

I. PROJECT DESCRIPTION

FMS #: **S195-227S**

PROJECT NAME: **Spring Street Salt Shed**

PROJECT DESCRIPTION: This Project consists of the construction of a new fully enclosed, cast-in-place concrete salt shed; gated service yard; lot line concrete protection and push walls, two 5,000 gallon liquid calcium chloride tanks with associated dispensing equipment and concrete protection wall. This facility shall be constructed on a drilled caisson foundation. The floor slab, service yard and drive shall be a structural concrete slab supported by drilled caissons. The building will have exterior walls of cast-in-place concrete and a precast concrete roof deck supported by steel plate girders. Work includes related site work, mechanical, plumbing, electrical and other items noted on the Contract Documents.

PROJECT LOCATION: **553 Canal Street**
BOROUGH: **Manhattan**
CITY OF NEW YORK
ZIP CODE: **10013**
COMMUNITY BOARD #: **2**

PROJECT MANAGEMENT:

- DDC shall publicly bid and enter into a single Contract for the Project. DDC shall manage the Project using its own personnel.
- DDC shall publicly bid and enter into a single Contract 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 (September 2008) entitled "The Resident Engineer".
- DDC has entered into CM/Build Contract for the Project. The CM/Build Contractor shall be responsible for conducting a competitive bid process and entering into the contract(s) for the Project.

II. CM / BUILD CONTRACT: REVISIONS TO THE GENERAL CONDITIONS

"Not Used"

III. CONTRACTS FOR THE PROJECT

The Project consists of a single contract, the Contract for General Construction Work. The Contractor for General Construction Work is responsible for the performance of all required work for the Project as set forth in the Contract Documents (General Conditions, Drawings and Specifications), including all responsibilities and obligations assigned to separate Contractors for the following subdivisions of the work: Plumbing Work, HVAC Work, and Electrical Work. All responsibilities and obligations in the Contract Documents assigned to separate Contractors for such subdivisions of the work are the responsibility of the Contractor for General Construction Work.

IV. SCHEDULES

The Contractor is advised that Schedules A through F 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.

V. APPLICABILITY OF ARTICLES AND AMENDED ARTICLES

The Contractor is advised that various Articles in the General Conditions may not apply to this Project or may apply as amended. Such Articles advise the Contractor to "Refer to the Addendum to the General Conditions for the applicability of this Article." Such Articles are set forth below. A check mark indicates whether the Article (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 Article, as set forth in the General Conditions, applies to the Project. Amended Articles, if any, are set forth following this list of Articles.

<u>Article No.</u>	<u>Article</u>	<u>Sub-Article or PART</u> (if applicable)	Applies	Does not Apply	Applies as Amended
1.04	Contract Drawings	C) PRINTS		X	
1.05	Shop Drawings and Record Drawings	B) INTEGRATED DRAWINGS	X		
1.09	Surveys		X		
1.13	Sleeves and Hangers		X		
1.15	Temporary Heat		X		
1.20	Progress Photographs		X		
1.26	Security Guards/Fire Guards on the Site		X		
1.29	Sleeve and Penetration Drawings		X		
1.30	Location of Partitions		X		
1.34	Temporary Services	PART A	X		
		PART B		X	

<u>Article No.</u>	<u>Article</u>	<u>Sub-Article or PART</u> (if applicable)	<u>Applies</u>	<u>Does not Apply</u>	<u>Applies as Amended</u>
1.35	Temporary Use, Operation and Maintenance of Elevators during Construction	PART A – For New Buildings Up to 15 Stories		X	
		PART B – For New Buildings Over 15 Stories		X	
		PART C – Existing Buildings		X	
1.36	General Mechanical Requirements		X		
1.37	General Electrical Requirements	PART B – Section A) Temporary Lighting	X		
		PART B – Section B) Site Security Lighting (New Construction)	X		
		PART D – Electrical Conduit System Including Boxes	X		
		PART E – Electrical Wiring Devices	X		
		PART F – Electrical Conductors and Terminators	X		
		PART G – Circuit Protective Devices	X		
		PART H – Distribution Centers	X		
		PART I – Motors	X		
		PART J – Motor Control Equipment	X		
1.40	Separation Between Trades			X	
1.42	Specific Requirements	C) BORINGS	X		
		E) WORK FENCE ENCLOSURE	X		
		G) RESIDENT ENGINEER'S OFFICE			
		1. OFFICE SPACE IN EXISTING BUILDING		X	
		2. TRAILER OFFICE	X		
		H) ADDITIONAL EQUIPMENT FOR THE RESIDENT ENGINEER	X		
		I) PUBLIC TELEPHONE		X	
		J) HEAD PROTECTION (HARD HATS)			X
		Q) PROJECT SIGN AND RENDERING			
		PART B – PROJECT RENDERING	X		

COMPUTER WORKSTATIONS

H) Number of Computer Workstations to be provided as outlined in Article 1.42 H, item 4:

AMENDED ARTICLES

The Contractor is advised that the amended Articles set forth below are included in the General Conditions and apply to the Project.

1.42 SPECIFIC REQUIREMENTS

J. PROTECTIVE CLOTHING (HARD HATS & VESTS)

1. The General Construction Contractor shall provide a minimum of fifteen (15) standard protective helmets with liners, safety vests with reflective stripes, and any additional protective clothing as needed for the exclusive use of the City of New York personnel and their visitors. Helmets and vests shall be turned over to the Resident Engineer and kept in his office.
2. Upon completion of the project, the helmets and vests shall become the property of the General Construction Contractor.

VI. ADDITIONAL ARTICLES

The Contractor is advised that the additional Articles set forth below are included in the General Conditions and apply to the Project.

1.43 SPECIFIED QUANTITIES

1. DEFINITION AND EXPLANATION

- A. Specified Quantities are quantities to be included in each bid so that the City of New York will have money available to pay the Contractor for the performance of certain work. Payment by the City of New York of specified quantities is contractual in nature only, and shall not be used for any other purpose. Only costs actually incurred by the City of New York will be paid for. Increases or decreases in the specified quantities shall be shown as "overruns" and/or "underruns."
- B. Such increases or decreases shall be binding on the City of New York and the Contractor, and shall not be the basis for additional compensation to the Contractor beyond that provided in the Contract Documents.
- C. Payment will be the actual cost as evidenced by bills from Subcontractors, materialmen and suppliers to the Contractor. Application for payment shall be made by the Contractor on Contractor's Estimate, Requisition and Application for partial payment, and shall be subject to audit and verification by the Construction Manager, the Commissioner, and the Comptroller.
- D. The Construction Manager will compare his records with the completed Estimate and Application furnished by the Contractor and make any necessary adjustments.
- E. The Contractor, upon notification by the Commissioner, shall promptly pay invoices submitted by the Subcontractors, materialmen, and suppliers, and approved by the Commissioner. When requesting payment, the Contractor shall submit with the partial estimate duly authorized proof of payment that the invoice, or invoices, in question have in fact been paid. Failure on the part of the Contractor to submit

satisfactory evidence that he has paid in full for such invoices shall preclude him from payments under the contract.

2. SPECIFIED QUANTITIES

A. Specified Quantities have been estimated for certain items. Contractor for General Construction work shall include cost for specified quantities in the Bid Schedule.

B. Specified Quantities as follows"

- a. If the aggregate length of piles and caissons installed in accordance with the requirements of the Contract, including the footage of piles abandoned due to encountering obstructions, be greater or less than the aggregate length specified, the Contract price will be adjusted in accordance with the applicable unit prices specified in the Bid Schedule. One-half foot or more shall be considered as one foot, less than one-half a foot shall be disregarded.

VII. SPECIAL EXPERIENCE REQUIREMENTS FOR THE PROJECT

- (1) **GENERAL:** Special Experience Requirements applicable to the contractor or subcontractor that will perform specific areas of work are set forth below.
- (2) **REVISION OF SPECIFICATIONS AND DRAWINGS:** In the event the Specifications and/or the Contract Drawings contain any Special Experience Requirement that is not set forth below, such Special Experience Requirement is deemed deleted, except as otherwise expressly provided in Section VIII of this Addendum.
- (3) **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 contractor intends to perform these specific areas of work with its own forces, it must demonstrate compliance with the special experience requirements. If the contractor intends to subcontract these specific areas of work, the 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.
 - (a) **Special Experience Requirement #1:** The contractor or subcontractor performing the work of this section 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. This Special Experience Requirement applies to the contractor or subcontractor that will perform specific areas of work specified in the sections set forth below.

General Construction

- Section 02780: Unit Pavers
- Section 03300: Cast-in-Place Structural Concrete
- Section 03330: Architectural Cast-in-place Concrete

- (b) **Special Experience Requirement #2:** The contractor or subcontractor performing the work of this section 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. In addition, the contractor or subcontractor must be certified, licensed or approved by the manufacturer. This Special Experience Requirement applies to the contractor or subcontractor that will perform specific areas of work specified in the sections set forth below.

General Construction

- Section 07124: EPDM Roofing

VIII. 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 Bid Booklet contains a Notice which identifies a particular product from a designated manufacturer as a "Proprietary Item", 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 Bid Booklet. Special Experience Requirements may apply to contractors, subcontractors, installers, manufacturers and/or suppliers. If the Specifications and/or the Contract Drawings contain any Special Experience Requirement that is not set forth in the Bid Booklet, 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, 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 entity 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 entity must be properly trained for the specified work.
 - (d) 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 Bid Booklet. In the event of any conflict or inconsistency between (1) the Notice regarding Alternate Bids set forth in the Bid Booklet and (2) a provision in the Specifications and/or the Contract Drawings regarding Alternate Bids, the Notice set forth in the Bid Booklet shall prevail. If the agency is not requesting the submission of Alternate Bids, as indicated by the absence of a Notice in the Bid Booklet, 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, 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, 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) 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.
- (b) 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.
- (c) 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.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)
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 FOR GENERAL CONSTRUCTION
Article 14 Contract	Time of Completion	Consecutive Calendar Days	365 ccds
Article 15 Contract	Liquidated Damages	For each consecutive calendar day over completion time	\$ 600
Article 17 Contract	Sub- contracts	Not to exceed percent of Contract Price	60%
Article 21 Contract	Retainage	Percent of voucher	If 100% bonds are required 5% If 100% bonds are not required, and Contract Price is less than \$500,000 10% If 100% bonds are not required, and Contract Price is more than \$500,000 10%
Article 24 Contract	Maintenance & Guaranty	Percent of Contract Price	1%
Article 77 Contract	MWBE Program	See Subcontractor Utilization Plan in the Bid Booklet	

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART I. 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
<p>■ Commercial General Liability Art. 22.1.1</p>	<p>\$ 1,000,000 per occurrence \$ 2,000,000 aggregate (applicable separately to this Project)</p> <p>Additional Insureds: 1. City of New York, including its officials and employees, and</p>
<p>■ Workers' Compensation Art. 22.1.2</p> <p>■ Disability Benefits Insurance Art. 22.1.2</p> <p>■ Employers' Liability Art. 22.1.3</p> <p><input type="checkbox"/> Jones Act Art. 22.1.4</p> <p><input type="checkbox"/> U.S. Longshoremen's and Harbor Workers Compensation Act Art. 22.1.4</p>	<p>Workers' Compensation: Statutory per New York State law without regard to jurisdiction</p> <p>Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction</p> <p>Employers' Liability: \$1,000,000 each accident</p>
<p>■ Builders' Risk Art. 22.1.5</p> <p><input type="checkbox"/> Installation Floater</p>	<p>Applicable to Builders' Risk or Installation Floater:</p> <p>_____ 100 _____ % of total value of Work</p> <p>City of New York and the Contractor named as Loss Payee for the Work in order of precedence, as their interests may appear.</p> <p><u>Note:</u> Article 22.1.5 is revised by deleting the following sentence: "Such policy shall name as insureds the City, the Contractor, and its Subcontractors". This deletion applies to Builders' Risk and Installation Floater.</p>

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART I. 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
<input checked="" type="checkbox"/> Comprehensive Business Auto Coverage Art. 22.1.6	\$ <u>1,000,000</u> per accident If vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered autos (endorsement CA 99 48) as well as proof of MCS 90 Additional Insured: 1. City of New York, including its officials and employees
<input checked="" type="checkbox"/> Pollution/Environmental Liability Art. 22.1.7	\$ <u>1,000,000</u> per occurrence \$ <u>2,000,000</u> aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Marine Protection and Indemnity Art. 22.1.8(a)	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART I. 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.

<input type="checkbox"/> Ship Repairers Legal Liability Art. 22.1.8(b)	\$ _____ each occurrence [Contracting agency to fill in total value of City vessels involved]
<input type="checkbox"/> Collision Liability/Towers Liability Art. 22.1.8(c)	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Marine Pollution Liability Art. 22.1.8(d)	\$ _____ each occurrence Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.9 <input type="checkbox"/> Railroad Protective Liability _____	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Broker's Certification

[Pursuant to Article 22.3.1(a) of the **Contract**, every Certificate of Insurance must be accompanied by either the following certification by the broker setting forth the following text and required information and signatures or complete copies of all policies referenced in the Certificate of Insurance. In the absence of completed policies, binders are acceptable.]

CERTIFICATION BY BROKER

The undersigned insurance broker represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects, and that the described insurance is effective as of the date of this Certification.

[Name of broker (typewritten)]

[Address of broker (typewritten)]

[Signature of authorized official or broker]

[Name and title of authorized official (typewritten)]

Sworn to before me this
____ day of _____, 201__

NOTARY PUBLIC

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. 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 shall be sent to the address set forth below or, in the absence of such address, to the **Commissioner's** address as provided elsewhere in this **Contract**.

ACCO's Office, Insurance Unit

30-30 Thomson Avenue, 4th Floor

Long Island City, New York 11101

SCHEDULE B

Guarantees and Warranties

(Reference: Article 1.22 of the General Conditions)

GUARANTY FROM CONTRACTOR

(1) **Contractor's Guaranty Obligation:** The Contractor shall promptly repair, replace, restore or rebuild, as the Commissioner may determine, any finished Work in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of Substantial Completion (or use and occupancy in accordance with the Contract), except for the areas of Work set forth below:

- Roofing, Waterproofing, and Joint Sealant Work. For these types of work, the guarantee period shall be (2) two years.
- Trees and/or Plant Material. For trees and/or plant material furnished and installed, the guarantee period shall be (2) two years. During the guarantee period, the Contractor shall provide all maintenance services set forth in the Specifications.

(2) **Guaranty Period:** The obligation of the Contractor, and its Surety under the Performance Bond, is limited to the period(s) of time specified above.

(3) **Other Provisions Deemed Deleted:** In the event the Specifications and/or the Contract Drawings contain any provisions regarding guaranty requirements, such provisions are deemed deleted and replaced with the guaranty requirements set forth in this Schedule B.

WARRANTY FROM MANUFACTURER

(1) **Contractor's Obligation to Provide Warranties:** The items of material and/or equipment for which manufacturer warranties are required are listed below. For each item of material and/or equipment listed below, the Contractor shall obtain a written warranty from the manufacturer. Such warranty shall provide that the material or equipment is free from defects for the period set forth below and will be replaced or repaired within such specified period. The Contractor shall deliver all required warranties to the Commissioner.

(2) **Required Warranties:**

Specification Number	Material or Equipment	Length of Warranty
02762	Traffic Paint Pavement Markings	1 Year
02930	Trees, Shrubs, Vines, and Ornamental Grasses	1 Year
02930	Ground Covers, Biennials, Perennials, and Other Plants	1 Year
02930	Annuals	3 Months
07124	Membrane Roofing, Roofing System and Components	20 Years
07130	Foundation Waterproofing - Material	5 Years
07130	Foundation Waterproofing - Installation	2 Years
07620	Sheet Metal Flashing and Trim - Finish	20 Years
07720	Roof Accessories - Finish	20 Years
07920	Elastomeric Joint Sealants - Installation	2 Years
07920	Elastomeric Joint Sealants	5 Years
08331	Overhead Coiling Door	5 Years
08391	Flood Barrier	1 Year
08620	Unit Skylights	5 Years

Specification Number	Material or Equipment	Length of Warranty
16500	Ballasts	5 Years
16500	Light Fixtures and accessories	1 Year
16500	Light Fixture Metal Finish	5 Years
16600	Lighting Control System	3 Years
16600	Special Warranty - Lighting Control System Components	3 Years
16600	Extended Warranty - Lighting Control System Components	8 Years
16600	Extended Warranty – Lighting Control System Relays	10 Years

(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.

SCHEDULE C

Contract Drawings

(Reference: Article 1.04(A) of the General Conditions)

The Schedule set forth below lists all Contract Drawings for the Project.

Architectural

- G-001 Cover & List of Drawings
- G-002 General Notes, Symbols & Abbreviations
- G-003 Building Code Summary
- G-004 Site Section

- Z-001 Zoning Resolution Summary & Diagrams
- Z-002 Zoning Diagrams
 - Survey Utility
 - Survey Topo

- A-001 Shed Egress Plan
- A-101 Site & Paving Plan
- A-102 Ground Floor Plan - El. 6'-11"
- A-103 Intermediate Plan Sections
- A-104 Intermediate Plan - El. 14'-5"
- A-105 Intermediate Plan - El. 46'-5"
- A-106 Roof Plan - El. 73'-0"
- A-111 Enlarged Drive Plan
- A-121 Reflected Ceiling Plan - El. 31'-5"
- A-201 Sections
- A-211 West Wall Elevations
- A-212 South Wall Elevations
- A-213 East Wall Elevations
- A-214 North Wall Elevations
- A-301 Wall Sections - West Wall
- A-302 Wall Sections - South Wall
- A-303 Wall Sections - South Wall
- A-304 Wall Sections - East Wall
- A-305 Wall Sections - East Wall
- A-306 Wall Sections - North Wall

- A-307 Wall Sections - North Wall
- A-400 Parapet Details
- A-401 Roof Details
- A-402 Site Details
- A-403 Concrete Details
- A-404 Gate Elevation and Details
- A-601 Door Elevations and Details

Civil

- C-001 LEGEND, GENERAL NOTES AND ABBREVIATIONS
- C-101 FINAL GRADING, PAVING AND UTILITIES
- C-102 FINAL GRADING, PAVING AND UTILITIES PARTIAL PLAN
- C-103 DETAILS – SHEET 1
- C-104 DETAILS – SHEET 2
- C-105 DETAILS – SHEET 3
- C-106 OWS AND 6,000 G UNDERGROUND RAINWATER COLLECTION TANK

Landscape

- L-101 Site Plan
- L-201 Site Details

Structural

- FO-100 Caisson Pile
- S-001 Structural General Notes and Abbreviations
- S-002 Structural Abbreviations and Load Diagrams
- S-003 Special Inspections Tables
- S-004 Standard Structural Details - Sheet 1
- S-005 Standard Structural Details - Sheet 2
- S-006 Standard Structural Details - Sheet 3
- S-101 Caisson Plan
- S-105 Foundation Plan
- S-110 Ground Floor Plan - El. 6'-5"
- S-111 Intermediate Plan – El. 14'-5"
- S-112 Intermediate Plan - El. 22'-5"
- S-113 Intermediate Plan – El. 30'-5"
- S-114 Intermediate Plan – El. 38'-5"
- S-115 Intermediate Plan - El. 46'-5"
- S-116 Roof Framing Plan and Bearing Plate Details
- S-117 Bearing Plate Details – Sheet 2
- S-118 Precast Plank Roof Plan
- S-119 Precast Plank Roof Schedule and Details

S-201	Cross Sections
S-202	Cross Sections
S-301	Wall Sections and Details
S-302	Wall Sections and Details
S-303	Wall Sections and Details
S-304	Roof Sections and Details
S-305	Roof Sections and Details
S-306	Plate Girder Sections and Schedule
S-307	Steel Plate Wall Protection Sections and Details
S-401	Site Section and Details
S-402	Site Sections and Details

Plumbing

P-000	LEGEND, SYMBOLS AND ABBREVIATIONS
P-100	FLOOR PLAN
P-101	ROOF PLAN, RISER DIAGRAM AND DETAIL

Lighting

EL-101	Detail Sheet 1
EL-102	Detail Sheet 2

Mechanical

H-000	LEGEND, SYMBOLS AND ABBREVIATIONS
H-100	PLANS
H-101	SCHEDULE, DIAGRAM AND DETAILS

Electrical

E-001	SYMBOLS, GENERAL NOTES, AND EQUIPMENT SCHEDULE
E-002	ONE LINE DIAGRAM
E-003	POWER AND LIGHTING FLOOR PLAN
E-004	POWER AND LIGHTING ROOF PLAN
E-005	SCHEMATICS AND PANEL SCHEDULES

Reference Drawings

B-101.00	RECORD OF BORING
B-102.00	RECORD OF BORING

SCHEDULE D

Electrical Motor Control Equipment

(Reference: Article 1.37, Part K of the 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.

Legend for Control Type

DB Disconnect Circuit Breaker (Switch)	P Pilot Light	BG Break Glass Station
TS Thermal Switch	F Firestat	HOA Hand-Off Auto.
MS Magnetic Starter	T Thermostat	PB Push Button Station
CMS Comb. Mag. Starter	AL Alternator	RO Remote "off"

Equip. Ident.	Location	# of Units	HP or KW	Volts and Phase	Control Type: See legend above	Remarks:
OHD - 1	Overhead Door	1		208/120 , 3ø	DB	
Gate - 1		1		208/120 , 3ø	DB	
Gate - 2		1		208/120 , 3ø	DB	
Pump - 1		1		208/120 , 3ø	DB	
Pump - 2		1		208/120 , 3ø	DB	
Storm Water Pump		1		208/120 , 3ø	DB	
LP - 1		1		208/120 , 3ø		
EAF - 1		1	1	208/120 , 3ø	CMS	
EAF - 1		1	1	208/120 , 3ø	CMS	
EAF - 1		1	1	208/120 , 3ø	CMS	
EAF - 1		1	1	208/120 , 3ø	CMS	
EAF - 1		1	1	208/120 , 3ø	CMS	

SCHEDULE E

Separation of Trades

(Reference: Article 1.40 of the General Conditions)

NOT USED

SCHEDULE F

Shop Drawing and Material Samples Schedule

(Reference: Article 1.41 of the General Conditions)

The Schedule set forth below lists all submittal requirements for the Contract. In the event of any conflict between the Specifications and this Schedule F, Schedule F shall take precedence; provided, however, in the event of an omission from Schedule F (i.e., Schedule F omits either a reference to or information concerning a submittal requirement which is set forth in the Specifications), such omission from Schedule F shall have no effect and the Contractor's submittal obligation, as set forth in the Specifications, shall remain in full force and effect.

CONSULTANT:
 TELEPHONE NUMBER:
 DDC PROJECT MANAGER:
 TELEPHONE NUMBER:

DATE: _____

APPROVED: _____
 (DDC RESIDENT ENGINEER/CPM)

REPORT DATE	FMS ID #/PROJECT ID #: CONTRACT REGISTRATION #: PROJECT NAME:	TRADE: SHOP DRAWING LOG SHEET #
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USE SEPARATE SHEET FOR EACH TRADE

SPEC. SECT. #	DESCRIPTION	COORD. WITH CONTR.	SUBMITTAL			SUB. DATE	REQ'D DEL.	FABRIC. TIME	SUBMISSIONS										
			SHOP DWG.	SAMPLE	CAT. CUTS				REC'D	RET'D	ACTION	REC'D	RET'D	ACTION	REC'D	RET'D	ACTION		
02200			X	X	X														
02260			X																
02470			X																
02503																			
02504			X	X															
02505			X																
02745				X															
02762					X														
02771			X																
02780			X																

SPEC. SECT. #	DESCRIPTION	COORD. WITH CONTR.	SUBMITTAL			SUB. DATE	REQ'D DEL.	FABRIC. TIME	SUBMISSIONS											
			SHOP DWG.	SAMPLE	CAT. CUTS				REC'D	RET'D	ACTION	REC'D	RET'D	ACTION	REC'D	RET'D	ACTION			
02826			X	X																
02950			X	X	X															
03100			X		X															
03200			X		X															
03300			X	X	X															
03330			X	X	X															
03350			X		X															
03411			X																	
05120			X		X															
05500			X	X																
05510			X																	
05532			X	X	X															
05730			X		X															
06100					X															
07124			X	X																
07130			X	X																
07620			X	X																
07720			X																	
07920				X																
07921				X																
08331			X	X																

TABLE OF CONTENTS
CONTRACT NO. 1 - GENERAL CONSTRUCTION

DIVISION 1 – GENERAL REQUIREMENTS

Not Required

DIVISION 2 - SITE CONSTRUCTION

02200	Earthwork
02260	Excavation Support and Protection
02470	Drilled Caisson Piles
02503	Installation of Buried Pipelines
02504	Sanitary and Storm Sewer Structures
02505	Leakage Tests
02745	Cast Laminated Glass Pavers
02762	Traffic Paint Pavement Markings
02771	Concrete Curbs, Headers and Sidewalks
02780	Unit Pavers
02826	Decorative Metal Fences and Gates
02930	Exterior Plants

DIVISION 3 – CONCRETE

03100	Concrete Forms and Accessories
03200	Concrete Reinforcement
03300	Cast-in-Place Structural Concrete
03330	Architectural Cast-in-place Concrete
03350	Concrete Finishes
03411	Precast Concrete Hollow Core Planks

DIVISION 4 - MASONRY

Not Required

DIVISION 5 - METALS

05120	Structural Steel
05500	Metal Fabrications
05510	Exterior Metal Stairs
05532	Stainless Steel Floor Grating and Plate
05730	Decorative Metal Railings

DIVISION 6 - WOOD AND PLASTICS

06100	Rough Carpentry
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DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07124 Ethylene-Propylene-Diene-Monomer (EPDM) Roofing
07130 Foundation Waterproofing
07620 Sheet Metal Flashing and Trim
07720 Roof Accessories
07920 Joint Sealants
07921 Concrete Paving Joint Sealants

DIVISION 8 - DOORS AND WINDOWS

08331 Overhead Coiling Doors
08391 Flood Barriers
08620 Unit Skylights

DIVISION 9 - FINISHES

09960 High Performance Coating

DIVISION 10 - SPECIALTIES

Not Required

DIVISION 11 - EQUIPMENT

Not Required

DIVISION 12 - FURNISHINGS

Not Required

DIVISION 13 - SPECIAL CONSTRUCTION

13210 Underground Storage Tanks

DIVISION 14 - CONVEYING SYSTEMS

Not Required

DIVISION 15 - MECHANICAL

15050	Basic Mechanical Materials and Methods
15051	Ductile Iron Pipe
15060	Hangers and Supports
15081	Piping Insulation
15120	Interior and Exposed Piping Schedule
15160	Storm Drainage Piping and Vents
15430	Plumbing Specialties
15810	Ductwork
15820	Ductwork Accessories
15830	Fans
15950	Testing, Adjusting and Balancing

DIVISION 16 - ELECTRICAL

16020	Temporary Electrical System
16050	Basic Electrical Materials and Methods
16055	Electrical Requirements for Shop-Assembled Equipment
16060	Grounding
16071	Supporting Devices
16075	Electrical Identification
16080	Electrical Testing Requirements
16121	Wires and Cables-600 Volts and Below
16130	Electrical Raceway Systems
16132	Underground Electrical Distribution System
16140	Wiring Devices
16210	Electric Service
16220	Electric Motors
16411	Disconnect Switches
16443	Panelboards
16491	Control Components and Devices
16500	Lighting Equipment Lamps and Ballasts
16600	Lighting Control System

APPENDIX

Appendix #1 Fixture Schedule

Geotechnical Report for Spring Street Salt Shed dated July 16, 2013 – Prepared by Camp Dresser and McKee.

END OF TABLE OF CONTENTS

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CONTRACT # 1
GENERAL CONSTRUCTION WORK

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SECTION 02200

EARTHWORK

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified shall be in accordance with the requirements of the Contract Documents and the New York City Building Code.
- B. Work of this Section, as shown or specified, shall be in accordance with the Sediment and Erosion Control Plan.

1.2 WORK INCLUDED

- 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 foundation walls, pile caps, grade beams etc, designated for removal; relocation of fence and fence posts when necessary and other structures encountered or left by wreckers, old walls, rubble, etc.
 - 2. All earth excavation to the bottom of 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 all floors and slabs on grade.
 - 5. Excavation, filling, grading and compacting to required elevations for appurtenances and site work.
 - 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.
 - 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 RELATED WORK

- A. Section 02260 – Excavation Support and Protection
- B. Section 02470 – Drilled Caisson Piles
- C. Section 03300 – Cast-in-Place Structural Concrete

1.4 STANDARDS AND REFERENCES

- A. ACI-318 latest edition - Building Code Requirements for Structural Concrete.
- B. Latest version of American Society for Testing and Materials (ASTM) standards.
 1. ASTM C 33 – Standard Specifications for Concrete Aggregates.
 2. ASTM D 422 – Standard Test Method for Particle Size Analysis of Soils (sieve only).
 3. ASTM D 1557 – Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 4. ASTM D 2216 – Test Method for Laboratory Determination of Water (Moisture) Content of Rock and Soil.
 5. ASTM D 2487 – Test Method for Classification of Soils for Engineering Purposes.
 6. ASTM D 2922 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 7. ASTM D 3017 – Test for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 8. ASTM D 4318 – Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- 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), Port Authority of New York and New Jersey (PANYNJ), and with applicable requirements of all other authorities having jurisdiction.
- D. New York City Building Code.

- E. "Geotechnical Report for the Spring Street Salt Shed Borough of Manhattan, New York" prepared by Camp Dresser and McKee, dated July 16, 2013.

1.5 CODE COMPLIANCE

- A. Conform to the relevant provisions of the Building Code and Rules and Laws of the City of New York.

1.6 WORK DEFINITIONS

- A. Wherever the word "excavating", "excavate", "excavation", "carried down", "remove", etc., are used, they shall be taken to include the removal of all brick work, rubble work, former foundation remnants rubbish, earth, as well as rock, boulders, steel grillages and concrete and all other materials and obstructions encountered; they shall also be taken to include all sheet piling, bracing, pumping, and all operations and items needed for the proper execution of the work. Excavation is considered unclassified.
- B. Where the words "finished grades", "finished grade lines", or "future finished grades", appear in these specifications, they shall be taken to mean the finished elevations as indicated on the drawings.
- C. Rough grading consists of cutting or filling to the elevation established on the Contract Drawings.

1.7 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. Atterberg Limits in accordance with ASTM D 4318
 - c. Soil classification in accordance with ASTM D 2487
 - d. Moisture content in accordance with ASTM D 2216
 - e. 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 50-lb (minimum) sample of each material proposed for use as fill, including, but not limited to general fill, drainage fill, structural fill, pavement subbase course, etc.

- C. Submit the name of approved material supplier and specific type and source of each material. Any change in source or soil type throughout the job requires approval of the Commissioner.
- D. 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 but not limited to following:
 - 1. Earth excavation procedures.
 - 2. Temporary excavation support where required by field conditions.
 - 3. Backfilling and compacting material, equipment and procedures.
- E. Catalog Cuts: Submit catalog cuts and manufacturer's literature for compaction equipment, and vapor barrier.
- F. Dewatering: Submit descriptions, drawings, and equipment specifications and other information detailing the means and methods to be used for local dewatering of deep pits. Methods 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.
- G. Certification For Examination of Site and Records: Before proceeding with the Work, submit certification in an acceptable form, signed by the Contractor, stating that careful examination has been made of the site, existing structures, existing adjacent structures, records of utility lines, test boring records, soil samples, subsurface exploration reports by the subsoil exploration consultant, the Drawings, and all other Contract Documents.

1.8 QUALITY ASSURANCE

- A. Qualifications of Contractor for work described in this Section shall not be less than three (3) years of field experience in earthwork operations.

1.9 FIELD QUALITY ASSURANCE

- A. Field Testing of Fill Areas: Prepared fill lifts will be tested and approved by the Commissioner 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 overlying 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 at locations and elevations as directed by the Commissioner.

1.10 PROJECT CONDITIONS

- A. The Spring Street Salt Shed site is an approximately 10,000 square feet trapezoidal lot. The site is bordered by Spring Street to the north, West Street to the west, Canal Street to the south, and the Holland Tunnel Ventilation Shaft to the east. The site is presently occupied by a one story brick structure without cellar space that is to be demolished to make way for the proposed salt shed. The north and south tubes of the Port Authority of New York and New Jersey (PANYNJ) Holland Tunnel exist adjacent to the site to both the north and south beneath Spring Street and Canal Street, respectively. According to PANYNJ drawings obtained for the Garage project and information provided on the structural drawings, the tunnel structures are about 40 to 60 feet below the existing sidewalk grade.
- B. The proposed development is a new DSNY Salt Shed structure. The overall building footprint is on the order of 7,600 square feet; the balance of the site will covered by a yard. Two below grade concrete tank enclosures will on the eastern portion of the site. The structure is to be on the order of 60-feet-tall at the highest point.
- C. Subsurface Conditions – As of April 2013, subsurface information at the site is not available. Assumptions regarding the subsurface conditions at the site are based on available geologic information and the subsurface information obtained from the Garage site and should be considered preliminary. The general stratigraphy underlying the site likely consists of miscellaneous fill material underlain by organic clay, silty sand, decomposed rock and mica schist bedrock. Detailed descriptions of each subsurface stratum are given below in the order of increasing depth.
1. Fill – A layer of historic fill should be anticipated to about 20 to 30-feet-deep. The fill may consist of sand, silt, brick, concrete, wood, cobbles and boulders and possibly former foundation elements and cribbing.
 2. Soft Organic Clay – An about 5 to 15-feet-thick organic deposit will likely be encountered directly below the fill layer. The organic deposit is expected to consist of black silt and clay containing various amounts of shells and organics.
 3. Silty Sand – A layer of silty sand with varying proportions of mica and gravel is expected to be beneath the fill and/or organic deposits, extending down to the decomposed rock or bedrock. The silty sand thickness is estimated to be about 60 to 90 feet thick.
 4. Decomposed Rock – A layer of decomposed rock, is expected to be encountered beneath the sand layer.
 5. Mica Schist Bedrock – The site is likely underlain by fine to coarse-grained mica schist and gneiss bedrock with the depth to bedrock expected to be about 90 to 120 feet below the existing site grades.
 6. Groundwater levels range from elevation -3.6 to -7.2 feet (Borough President of Manhattan Datum) on the adjacent Garage site. It is anticipated that groundwater levels at the Salt Shed site will be affected by water pumping in the Holland Tunnel. Specific groundwater readings for the Salt Shed site can be provided after the subsurface information is available.

D. Adjacent Structures:

1. The Holland Tunnel Vent Shaft Building is adjacent to the eastern border of the site. The building is approximately 190-feet-long and 50-feet-wide and covers the remainder of the block not occupied by the site. The bottom of the vent shaft building is at about el -50; this is approximately 45 feet below the salt shed top of slab.
2. The Holland tunnel underlies Spring Street and Canal Street. Based on drawings made available by the Port Authority of New York and New Jersey (PANYNJ), the tunnel was constructed with brick and concrete using cut-and-cover methods. Because the proposed construction will be in such close proximity to the existing tunnel structure, PANYNJ approval will be necessary prior to commencement of excavation and foundation construction at the site.

- E. The Contractor, by careful examination, shall inform himself 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.
- F. The Contractor shall be held to have visited the site and to have familiarized himself with the existing conditions of adjoining properties, utilities and buildings.
- G. Soil samples and rock cores will be available for the Contractor's review. The City of New York makes no predictions or representations regarding the character or extent of soil, rock, or other subsurface conditions to be encountered during the work. The Contractor shall make his own deductions of the subsurface conditions which may affect the methods or cost of construction of the work hereunder, and he agrees that he will make no claims for damages or compensations, except as are provided under the agreement, should he find conditions during the progress of the work different from those as calculated and/or anticipated by him. Additional borings and other exploratory operations may be performed by Contractor, at the Contractor's option and following the City of New York approval. No change in the Contract Sum will be authorized for such additional exploration undertaken by the Contractor.
- H. 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.
- I. Existing Utilities: Locate existing underground utilities in and beyond the areas of work. If utilities are indicated to remain in place, provide adequate means of support and protection during the work.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with City and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 2. Do not interrupt existing utilities serving facilities occupied by City of New York or others, during occupied hours, except when permitted in writing by the Commissioner and then only after acceptable temporary utility services have been provided. Provide minimum of 48-hour notice to the Commissioner, and receive written notice to proceed before interrupting any utility.
 3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- J. Examine drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades.
- K. Compliance with all federal, state and local environmental and health and safety regulators, including but not limited to Occupational Safety and Health Administration (OSHA).

1.11 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 Contract occur, the Contractor shall repair such damage and shall assume all responsibility for such injury.
- 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. If live utilities are within the proposed building footprint, the Contractor shall coordinate their relocation or removal by others.
- 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 at no cost to the City of New York.
- 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. Refer to Specification Section 02260. 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 Holiday.

1.12 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 his 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 City of New York and the Geotechnical Engineer.

1.13 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 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, New York State Department of Transportation, Port Authority of New York and New Jersey (PANYNJ), and the utility companies involved.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Structural Fill or Controlled Fill: Clean sand and gravel or other porous material as accepted, containing not more than 10% by weight of materials finer than No. 200 mesh sieve and not more than 10% retained on a 3/4" sieve.
- B. 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 30% by weight materials finer than No. 200 mesh sieve.
- C. 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.
- D. Before bringing any fill to the site, the Contractor shall submit the source for approval by the Commissioner.
- E. 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.
- F. The use of recycled concrete aggregate as structural or general fill shall be permitted for non-drainage applications provided it meets the gradation requirements above.

PART 3 EXECUTION

3.1 PREPARATION OF PROJECT SITE

- A. Obtain all necessary permits to perform the work from the appropriate authorities and agencies prior to start of such work. Obey all applicable local and federal work safety rules and regulations.

- B. Install all necessary protection equipment, structures such as fences, signs, scaffolding etc. prior to start of work.
- C. Remove all existing structures, utilities, pavement in accordance with the Contract Documents.
- D. Protect all utility lines, which are not to be abandoned. Contractor shall be responsible for any damage to them that may occur.

3.2 PUMPING AND DEWATERING

- A. Provide adequate pumps, well points, or other equipment, appurtenances, power, drains, materials and labor necessary to keep pile cap or mechanical pit excavations continuously dry during excavation, construction, and backfilling and at such other times as the progress of the work may demand or as necessary to insure safety to the structure shall be provided.
- B. All pumping and dewatering both inside and outside the areas of the building shall be performed, continued, and maintained as required for the completion of all work, including the work of the mechanical trades, throughout the period of the contract.
- C. During excavation for and placing of pile caps and slabs, the ground water level shall be maintained at a minimum of 1 ft below the bottoms of the pile caps, working slabs and framed and unframed slabs. All pumped water shall be removed from the building area.
- D. If upward seepage occurs during excavation and soils become disturbed, excavation shall stop until the dewatering system is deepened, increased, or otherwise changed to effectively pre-lower the water below the excavation.
- E. 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.
- F. Install and operate dewatering system or systems in such a manner as to avoid the movement of fines or loss of ground from below the bearing levels and so as not to influence the facilities needed to eliminate loss of ground.
- G. The Contractor shall be responsible for all remedial action due to problems arising from improper/illegal dewatering. The Contractor shall obtain all permits from governing regulatory agencies, including but not limited to New York City Department of Environmental Protection (DEP) and New York State Department of Environmental Conservation (DEC), for dewatering and the off-site disposal of water.
- H. Dispose of water from site in such manner as will not cause injury to the public health, nor to public or private property, nor to the work completed or in progress, nor to the surface of the streets, nor cause any interference with the use of the same by the public. Contaminated water generated from dewatering activities shall be disposed in accordance with applicable regulations and permits. Prevent silting of storm sewers by using settling tanks or other devices approved by the DEP. Clean sewer lines that are to be used for disposal of water and waste during construction. The Contractor is responsible for obtaining all necessary permits for disposal of liquids generated during dewatering operations and for the

pretreatment of all liquids as required for disposal in accordance with all applicable rules and regulations.

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 Contract occur, the Contractor shall repair such damage and shall assume all responsibility for such injury.
- B. Protection and monitoring of adjacent structures shall be in accordance with the Section 02260 - Excavation Support and Protection Specifications.

3.4 SUPPORT OF EXCAVATION SIDES AND EXISTING ADJACENT FOUNDATIONS

- A. Support of excavation sides and the adjacent structures foundations shall be in accordance with the Section 02260 - Excavation Support and Protection Specifications.

3.5 GENERAL EXCAVATION

A. GENERAL

1. 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.
2. All excavation shall extend to the depths of the form and size required for the installation of the work as indicated on the drawings. When excavations for foundations have reached the required depths, Geotechnical Consultant shall make an inspection of the conditions. The balance of the excavation work shall be by hand.
3. Excavation shall be to required elevations for floors pits, pile caps, slabs, walls, etc. Excavation shall be made to a depth that will allow installation of full depth of concrete slabs, sub-base, waterproofing as shown on drawings and 1 inch tolerance. Excavation lines shall provide sufficient clearance for the proper execution of all concrete work including allowances for form work, shoring and inspection.
4. 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.
5. The bottom of excavations shall be leveled off and graded to receive foundations, slabs, pits, trenches and grade beams.
6. Take all necessary measures to maintain vibration levels below the allowable limits given in Section 02260 - Excavation Support and Protection specifications.

7. Take all necessary measures to maintain any vertical and lateral movement of the adjacent structures, streets, utilities below the allowable limits given in Section 02260 - Excavation Support and Protection specifications.

3.6 TRENCH EXCAVATION

- A. Excavation for Utilities, Drainage Piping, Within and Outside the Building Limits (trenches)
 1. Trenches for underground conduit, piping, drainage piping, where necessary, shall be excavated to the required depth and bell holes shall be provided where necessary to insure uniform bearing. Trench excavation lines shall provide sufficient clearance for the proper execution of underground mechanical work.
 2. Trenches shall be by open cut from the surface. No tunneling shall be allowed except by consent of the Geotechnical Consultant. Irregularities at bottom of trench, or where excavation is below required depth, shall be refilled to required grade with compacted controlled fill or gravel.
 3. Pipe trenches shall be excavated and minimum cover shall be provided to required depths as per the New York City Building Code.
 4. Where trench subgrades are wet or such that in the opinion of the Geotechnical Consultant are unsuitable for supporting the piping, utilities will be pile supported or suspended from the structural slabs.
 5. Where necessary, the sides of trenches and excavations shall be supported by adequate sheeting and bracing to insure proper construction and safety of the workers. The Contractor will be held responsible for the sufficiency of sheeting and bracing and for all damages to property or injury to persons resulting from improper quality, strength, placing, maintaining and removing of same.
 6. Immediately after piping has been installed, tested, inspected, and accepted, piping shall be filled around with special care to solidly fill voids without causing injury to piping. Piping trenches shall be backfilled using approved controlled fill. Up to 2 ft above pipe, 4-inch thick layers shall be hand filled. For remainder of trench, 12-inch thick layers shall be filled in. Each layer shall be compacted in accordance with the requirements given in sections below before placing next layer. No pieces larger than 2 inches in any dimension shall be allowed in fill up to 2 ft above pipe and no pieces larger than 4 inches in any dimension shall be allowed in fill above.
 7. Existing utility lines to be retained that are shown on the drawings or the locations of which are made known to the Contractor prior to excavation operations, shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor.
 8. As backfilling proceeds, all sheeting and shoring shall be removed in such a manner as to prevent the sides of the excavation from caving in or cracking. No backfilling of utility lines shall be done until all testing and inspection of the system or portion of the system has been completed and accepted.

B. Excavation for Building Slabs and Structural Members

1. 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 shall consist of material that meets the bearing capacity requirements given in the Contract Documents. Subgrades resulting from excavation shall be free of unsuitable material (fill, loose rock pieces, organics, debris, etc.) as judged by the Commissioner.
2. **Unauthorized Excavation:** Excavations performed below the elevations shown or specified, shall be filled and compacted as hereinafter specified, at no additional cost.
3. **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.

3.7 PROOFROLLING

- A. Prior to backfilling, all excavations should be proofrolled using a minimum 3-ton roller. Any loose areas identified by proofrolling should be removed and replaced with controlled fill in accordance with Section 3.8.

3.8 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 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. If Contractor elects to backfill against foundation or walls prior to completion of supporting floor slabs, these walls shall be shored. Temporary shoring shall be designed by a professional engineer retained by the Contractor. Shoring design and calculations shall be submitted to the Commissioner for their review and approval.
- J. In placing backfill, take special care to prevent wedge action, eccentric loading or overloading of the structure by equipment used for compacting backfill material, and to prevent damage to waterproofing on walls. Where subsoil drainage systems are installed, place backfill to prevent any damage to the systems. Any damage to waterproofing or drainage systems caused by backfilling or excavation operations shall be corrected or replaced by the Contractor at his own expense.
- K. 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.
- L. 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.
- M. 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.

3.9 FIELD QUALITY CONTROL

- A. The Commissioner will employ, at his own expense, certified engineers to review all laboratory test results and submitted reports specified in this Section.
- B. The Commissioner will interpret the tests, state in each report whether or not the test specimens and results comply with all requirements of the Contract Documents and note any deviations.
- C. The Commissioner will identify when and where samples are to be obtained for testing.
- D. The Contractor shall collect samples and forward them to the City of New York's Testing Laboratory. Testing Laboratory will submit the following laboratory test reports to the Commissioner.
 - 1. Laboratory results conducted on each type of borrow and fill material:
 - a. Gradation Analysis – ASTM D 422.
 - b. Atterberg Limits – ASTM D 4318.
 - c. Modified Moisture Density Curve Determination – ASTM D 1557.
 - 2. The Commissioner will determine the conformance of materials to be used for fills.
- E. Field Inspection:
 - 1. All field inspections shall comply with the requirements of the New York City Building Code.
 - 2. Slab-on-Grade Subgrade: The City of New York's Geotechnical Engineer shall inspect subgrades for all slabs on grade. No pavement or slab shall be constructed unless the subgrade is approved by the City of New York's Geotechnical Engineer.
 - 3. Proofrolling: Proofrolling operations shall be inspected by the City of New York's Geotechnical Engineer.
 - 4. Backfilling and Compaction: The City of New York shall hire a testing agency 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 City of New York's 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.

3.10 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 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 02200

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SECTION 02260

EXCAVATION SUPPORT AND PROTECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Provide excavation support in accordance with the requirements of the Contract Documents and the New York City Building Code.

1.2 WORK INCLUDED

- A. The work of this Section includes, but is not limited to, the following:
 1. Pre- and Post- construction survey - Conditions of surrounding buildings, New York State Department of Transportation (NYSDOT) Route 9A, and Port Authority of New York and New Jersey (PANYNJ) Holland Tunnel structures are to be surveyed prior to start of Work. Conditions are to be documented with photographs and a written report is to be provided.
 2. Excavation support shall be designed by a Professional Engineer licensed in the State of New York.
 3. All engineering, surveying, layout, monitoring, and submittals in connection of the work of this Section.
 4. Excavation support and any soil support necessary to maintain a safe excavation, and to protect existing buildings, tunnel, streets, walkways, utilities, and other improvements, excavation against loss of support and meet PANYNJ requirements.
 5. Maintenance of excavation support.
 6. Removal of bracing as required.
 7. Monitoring of horizontal and vertical movements of adjacent structures, New York State Department of Transportation (NYSDOT) Route 9A, and Port Authority of New York and New Jersey (PANYNJ) Holland Tunnel in accordance with this specification; and the NYSDOT and/or PANYNJ requirements.

1.3 RELATED WORK

- A. Section 02200 – Earthwork
- B. Section 02470 – Drilled Caisson Piles

C. Section 03300 – Cast-in-Place Structural Concrete

1.4 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards.
- B. 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), Port Authority of New York and New Jersey (PANYNJ), and with applicable requirements of all other authorities having jurisdiction.
- C. “Key Geotechnical Aspects for Spring Street Salt Shed,” Technical Memorandum, prepared by Langan, dated 12 February 2013.
- D. ASTM A572 Standard Specification for Structural Steel Shapes, Grade 36
- E. American Welding Society AWS D1.1-86 Structural Welding Code-Steel.
- F. New York City Building Code.

1.5 SUBMITTALS

- A. Unless otherwise indicated, transmit all submittals to the Commissioner for review by the City of New York’s Geotechnical and Structural Engineers before proceeding with ordering, fabricating, or any other work of this Section. Submittal review will be of the concept only and shall not in any way diminish or limit the Contractor’s responsibility for the design, performance, and quality of the work of this section and for the protecting of existing structures.
- B. The foundation contractor’s Professional Engineer registered in the State of New York will assume responsibility for excavation support design and inspection and will sign and seal the TR Forms for excavation support, and structural stability of adjacent structures.
- C. The Contractor’s Professional Engineer shall prepare an outline of the Contractor’s construction methods and step-by-step procedures together with plans and details of the excavation support system to satisfy the New York City Building Code requirements and approved drawings. This shall be coordinated with the relevant submittals identified in Section 02200 (Earthwork), and shall be submitted and reviewed by the City of New York’s Geotechnical and Structural Engineers for concept prior to submittal of the more detailed shop drawings.

- D. Method Statements: Prepare and submit method statements and drawings of all items in this Section, in accordance with the Contract Documents at least 15 days before beginning work. The method statements and drawings shall be submitted signed and sealed by Professional Engineer licensed in the State of New York engaged by the Contractor.
1. Excavation Support: Provide a phased excavation schedule clearly defining the limits of the excavation as they relate to the installation of the lateral bracing system to satisfy the New York City Building Code requirements and approved drawings. Provide method statements and drawings that show the dimensions, limits, and layout of the excavation support system. Provide representative sections for each side of the excavation that include structural details of the cut off wall, the existing walls to remain, and bracing elements. Provide elevations that give the location and identification of all lateral bracing elements. Provide a schedule that gives design load in each brace, and were anchors are used proof test load, and lock-off load.
- E. Calculations: Provide calculations signed and sealed by a professional engineer licensed in the State of New York for the excavation support system shown on the method statements. The calculations shall include the design assumptions, lateral earth pressures, surcharge loads, and vertical building loads and be consistent with the New York City Building Code requirements. They shall include design stresses and total loads in the structural steel and concrete elements during each phase of the site excavation and bracing installation. Lastly, the calculations shall provide an overall stability analysis to justify embedment depths and extent of lateral bracing. Provide separate calculations for concentrated loadings such as that imposed by the hoist or crane. If vertical sheeting or lateral bracing is deemed not necessary, provide stability analysis computations to justify these conclusions.
- F. Submit qualification data for firms and persons specified herein, to demonstrate their capabilities and experience. Include list of completed projects with project names addresses, telephone numbers, names of Architects and Owners.
- G. Pre- and Post-Construction Conditions Survey: The Contractor shall perform pre- and post- conditions verification survey. The Contractor shall submit his Pre-Construction Conditions Survey report at least 15 days before beginning the work. The Contractor shall submit his Post-Construction Conditions Survey report within 30 days after completion of the work.
- H. Monitoring Plans for Adjacent Structures:
- a. Submit the monitoring plan specified herein at least 2 weeks before proceeding with the work.
 - b. The plan shall graphically identify in plan and an elevation the type of monitoring point (i.e. optical survey, surface points, crack gages, benchmarks, etc.), with each monitoring point bearing a unique identification number. Where required, provide section drawings (i.e. excavation faces, building facades, etc.)

and identify the elevations (Borough President of Manhattan datum) at which monitoring points have been or will be installed.

- c. The drawings shall be updated and resubmitted in the event that monitoring points are abandoned, relocated, or additional monitoring points are added.
- d. All monitoring data shall be submitted by the Contractor's Professional Engineer for review by the Commissioner daily. Measurement data shall be submitted within 24 hours of taking each reading. All data shall be transmitted in electronic format and hard copies suitable to the Commissioner. The reports shall include the raw data points as well as graphs and tables summarizing the monitoring data including cumulative measurements recorded as a function of time. Where required requisite notes shall be included to document construction activities performed during the monitoring increment.

1.6 QUALITY ASSURANCE

- A. Contractor Qualifications: The Contractor performing the work of this Section shall demonstrate that they have at least 3 years of recent field experience on projects of similar size, scope, and complexity.
- B. Design Supervision: The Contractor shall retain the services of a Professional Engineer licensed in the State of New York who shall design and supervise installation of all work of this Section. The Contractor's Professional Engineer shall sign, seal and submit all relevant New York City Building Department Technical Report forms.
- C. Surveying and Monitoring: Engage and assign survey and monitoring work of this Section to a Professional Land Surveyor licensed in the State of New York. The results of all monitoring work of this Section shall be made immediately available to the Contractor's Professional Engineer responsible for the design supervision of the work specified herein.
- D. Codes and Permits:
 - 1. Comply with New York City Building Code requirements and approved drawings.
 - 2. 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), Port Authority of New York and New Jersey (PANYNJ), and with applicable requirements of all other authorities having jurisdiction.

3. All labor, materials, equipment and services necessary to make the work comply with such requirements shall be provided without additional cost to the City of New York.
 4. The Contractor shall procure and pay for all permits and licenses required to complete the work of this Section.
- E. Special Engineering Inspection:
1. Before commencing work of this Section, meet with representatives of the governing authorities, Construction Manager, City of New York, Commissioner and other concerned entities. Review the excavation and earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
 - a. The sheeting and shoring, and structural stability shall be subject to special inspection, which will be done by the Special Inspector responsible for the respective New York City Department of Buildings, TR-forms. The special inspector will be retained by the City of New York.

1.7 PROJECT CONDITIONS

- A. The Spring Street Salt Shed site is an approximately 10,000 square feet trapezoidal lot. The site is bordered by Spring Street to the north, West Street to the west, Canal Street to the south, and the Holland Tunnel Ventilation Shaft to the east. The site is presently occupied by a one story brick structure without cellar space that is to be demolished to make way for the proposed salt shed. The north and south tubes of the Port Authority of New York and New Jersey (PANYNJ) Holland Tunnel exist adjacent to the site to both the north and south beneath Spring Street and Canal Street, respectively. According to PANYNJ drawings obtained for the Garage project and information provided on the structural drawings, the tunnel structures are about 40 to 60 feet below the existing sidewalk grade.
- B. The proposed development is a new DSNY Salt Shed structure. The overall building footprint is on the order of 7,600 square feet; the balance of the site will be covered by a yard. Two below grade concrete tank enclosures will be on the eastern portion of the site. The structure is to be on the order of 60-feet-tall at the highest point.
- C. Subsurface Conditions – As of April 2013, subsurface information at the site is not available. Assumptions regarding the subsurface conditions at the site are based on available geologic information and the subsurface information obtained from the Garage site and should be considered preliminary. The general stratigraphy underlying the site likely consists of miscellaneous fill material underlain by organic clay, silty sand, decomposed rock and mica schist bedrock.

Detailed descriptions of each subsurface stratum are given below in the order of increasing depth.

1. Fill – A layer of historic fill should be anticipated to about 20 to 30-feet-deep. The fill may consist of sand, silt, brick, concrete, wood, cobbles and boulders and possibly former foundation elements and cribbing.
2. Soft Organic Clay – An about 5 to 15-feet-thick organic deposit will likely be encountered directly below the fill layer. The organic deposit is expected to consist of black silt and clay containing various amounts of shells and organics.
3. Silty Sand – A layer of silty sand with varying proportions of mica and gravel is expected to be beneath the fill and/or organic deposits, extending down to the decomposed rock or bedrock. The silty sand thickness is estimated to be about 60 to 90 feet thick.
4. Decomposed Rock – A layer of decomposed rock, is expected to be encountered beneath the sand layer.
5. Mica Schist Bedrock – The site is likely underlain by fine to coarse-grained mica schist and gneiss bedrock with the depth to bedrock expected to be about 90 to 120 feet below the existing site grades.
6. Groundwater levels range from elevation -3.6 to -7.2 feet (Borough President of Manhattan Datum) on the adjacent Garage site. It is anticipated that groundwater levels at the Salt Shed site will be affected by water pumping in the Holland Tunnel. Specific groundwater readings for the Salt Shed site can be provided after the subsurface information is available.

D. Adjacent Structures:

1. The Holland Tunnel Vent Shaft Building is adjacent to the eastern border of the site. The building is approximately 190-feet-long and 50-feet-wide and covers the remainder of the block not occupied by the site. The bottom of the vent shaft building is at about el -50; this is approximately 45 feet below the salt shed top of slab.
2. The Holland tunnel underlies Spring Street and Canal Street. Based on drawings made available by the Port Authority of New York and New Jersey (PANYNJ), the tunnel was constructed with brick and concrete using cut-and-cover methods. Because the proposed construction will be in such close proximity to the existing tunnel structure, PANYNJ approval will be necessary prior to commencement of excavation and foundation construction at the site.

- E. The Contractor, by careful examination, shall inform himself 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.

- F. The Contractor shall be held to have visited the site and to have familiarized himself with the existing conditions of adjoining properties, utilities and buildings.
- G. Soil samples and rock cores will be available for the Contractor's review. The City of New York makes no predictions or representations regarding the character or extent of soil, rock, or other subsurface conditions to be encountered during the work. The Contractor shall make his own deductions of the subsurface conditions which may affect the methods or cost of construction of the work hereunder, and he agrees that he will make no claims for damages or compensations, except as are provided under the agreement, should he find conditions during the progress of the work different from those as calculated and/or anticipated by him. Additional borings and other exploratory operations may be performed by Contractor, at the Contractor's option and following the City of New York approval. No change in the Contract Sum will be authorized for such additional exploration undertaken by the Contractor.
- H. 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.
- I. Existing Utilities: Locate existing underground utilities in and beyond the areas of work. If utilities are indicated to remain in place, provide adequate means of support and protection during the work.
 - 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with City of New York and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 - 2. Do not interrupt existing utilities serving facilities occupied by City of New York or others, during occupied hours, except when permitted in writing by the Commissioner and then only after acceptable temporary utility services have been provided. Provide minimum of 48-hour notice to the Commissioner, and receive written notice to proceed before interrupting any utility.
 - 3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- J. Examine drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades.

- K. Compliance with all federal, state and local environmental and health and safety regulators, including but not limited to Occupational Safety and Health Administration (OSHA).

1.8 PROTECTION

- A. The project site is an urban area. The work shall be executed so that no damage or injury will occur to the existing public and adjoining or adjacent structures, PANYNJ structures, NYSDOT and NYCDOT streets, paving, sewers, gas, water, electric or any other pipes. Should any damage or injury caused by the Contractor, or anyone in Contractor's employ, or by the work under this Contract occur, the Contractor shall, at own expense, repair such damage and shall assume all responsibility for such injury.
- 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 at no cost to the City of New York.

1.9 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 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, New York State Department of Transportation, Port Authority of New York and New Jersey (PANYNJ), and the utility companies involved.

1.10 DEFINITIONS

- A. Temporary Support System: Support system utilized to support earth excavation sides. Support system includes but not limited to anchors, soldier piles, concrete piers, rakers, lagging etc.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Provide suitable bracing and soil support materials which will withstand loads imposed without exceeding the movement criteria provided herein. Materials shall be kept in serviceable condition at all times.

- B. Steel shapes shall conform to ASTM A-36 having a yield strength of 36 ksi or greater. Rolled pipe shall conform with ASTM A-572 with a yield strength of 35 ksi, or 45 ksi.
- C. Lagging or other lumber shall meet requirements for structural lumber.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall provide, erect and maintain sheeting and bracing around all sides of excavations. Locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces.
- B. Lateral bracing shall be erected and maintained to the entire satisfaction of any City, State or local authorities having jurisdiction.
- C. The construction and performance of the sheeting, bracing and soil support work for the purpose of which it is erected shall be the entire responsibility of the Contractor.
- D. Should any subsidence or any other damage occur due to the inefficiency of the work, the damage shall be made good by the Contractor at his own expense.
- E. The Contractor shall make use of such methods of work as are best adapted to preserve the safety and stability of foundations, walls, and other parts of affected buildings or structures.

3.2 LATERAL BRACING

- A. Lateral bracing shall be designed and constructed in accordance with the New York City Building Code requirements.
- B. It shall be adequate to resist earth and hydrostatic pressures and lateral pressures due to surcharge loads, to prevent displacement of adjacent ground; and to prevent loss of support or damage to buildings, utilities, sidewalks, tunnel, and streets. Lateral loads created from adjacent structures, cranes, and/or street loads shall be included in the design.
- C. The sheeting shall have adequate size and adequate lateral bracing to meet design standards for allowable stresses and factors of safety for temporary construction.
- D. All the above work shall be carried on in such a manner as not to interfere with the progress of the work under this Contract.
- E. Sheeting and bracing may be removed, left in place, or cut as approved by the Commissioner. Any material that affects finished construction shall be removed. Carefully remove materials such that no loss of support occurs beneath areas adjacent to the sheeting. Any material left in place must be removed not less

than 4-ft below finish grade. Sheeting and bracing material removed from the excavation shall be immediately removed from the site and property disposed of in accordance with all applicable State, City, and Federal Codes.

- F. Where sheeting and bracing is required to withstand earth pressures resulting from backfill placement, the backfill shall not be placed until after sheeting and bracing has been completely installed. Materials shall not be removed until the supporting structure has attained adequate strength.
- G. Support of Soil Cuts:
 - 1. Temporary walls shall be provided along the sides of excavations in soil, and any other material not self-supporting as determined by the Contractor's Professional Engineer.

3.3 MONITORING EXISTING STRUCTURES

- A. The City of New York's independent consultant will perform vibration monitoring. Construction induced vibrations will be monitored continuously during any foundation construction activities including but not limited to excavation, installation of support of excavation, caisson construction, dewatering, and construction of foundations, with a written report submitted daily summarizing monitoring results.
- B. Contractor's Monitoring Requirements -The Contractor will be responsible for monitoring all vertical and lateral movements along the site perimeter, surrounding structures, and the Holland tunnel. Vertical and lateral readings will be taken on by a daily basis, or otherwise directed by the City of New York, during any foundation construction activities including but not limited to excavation, installation of support of excavation, caisson construction, dewatering, and construction of foundations.
 - 1. Vertical and Lateral Displacements -
 - a. Before starting work and after the completion of work, the Contractor's Professional Engineer and Land Surveyor shall check and verify governing dimensions and elevations, survey conditions of adjoining properties, and record any prior settlement or cracking of structures, pavements, and other improvements. The Contractor shall video all adjacent structures prior to the beginning of any construction activities.
 - b. Install a minimum of 10 lateral and vertical reference points (5 close to the base, 5 close to the roof) on the ventilation shaft's west façade, abutting the site. In addition, provide reference points at the ground surface, all-around the site perimeter, at 25 ft on-center. All monitoring locations shall be subject to review by the Commissioner.

- c. Install lateral and vertical reference points in the Port Authority of New York and New Jersey (PANYNJ) Holland Tunnel inbound and outbound tubes.
- d. The monitoring points shall be established by the Contractor employing a Professional Land Surveyor licensed in the State of New York, and referenced to a fixed off-site benchmark. The Contractor shall video all monitoring points prior to the beginning any construction activities.

2. Ground Vibrations -

- a. The vibration monitoring locations shall be selected by the Commissioner for controlled inspection.
- b. The seismographs will be provided by, and the monitoring performed by an engineer or testing laboratory engaged by the City of New York.
- c. Monitoring shall be performed prior to the start of work to obtain ambient levels, and daily during excavation and foundation construction work. Written reports summarizing the monitoring results shall be submitted to the Commissioner.

C. Frequency and Reporting

- 1. Vertical and Lateral Displacements - Monitoring shall be performed on a daily basis during any excavation support or foundation work. Readings shall be taken to nearest 0.005 ft. Written reports summarizing the monitoring results shall be submitted by the Contractor's Professional Engineer for review by the Commissioner daily. The reports shall be submitted in both electronic copies and hard copies. The reports shall include the raw data points as well as graphs and tables summarizing the monitoring data including cumulative measurements recorded as a function of time. Where required requisite notes shall be included to document construction activities performed during the monitoring increment.
- 2. Ground Vibrations - The ground vibrations caused by the foundation work, bracing and foundation installation operations shall be monitored continuously with threshold-type seismographs capable of measuring ground movements to 0.02 in/sec. Written reports summarizing the monitoring results shall be submitted by the City of New York's independent consultant for review by the City of New York's Structural and Geotechnical Engineers daily.

D. Thresholds

1. Vertical and Lateral Displacements - The maximum allowable movements of the adjacent buildings and structures shall be 1/4 inches for horizontal movement and 1/4 inches for vertical movements. The action thresholds shall be three consecutive readings of 1/16 inch of movement, or one confirmed reading of 1/8 inch.
2. Ground Vibrations – The maximum allowable ground vibration immediately adjacent to any of the adjacent structures is 0.5 in/sec.

E. Action Items

1. Any movement exceeding the above criteria will be reported immediately to the Commissioner. Work in the immediate area will cease. The Contractor's engineer will be responsible for structural stability and will make an inspection of the affected structures within 24 hours of the reported exceedances. The engineer will prepare a report assessing the condition of the affected building and any required remediation. The report will be submitted to the Commissioner, the design team, and the DOB Forensic Unit within 48 hours of the incident. If the building is judged to be in an unstable condition, the DOB will be notified immediately.
2. The Contractor may establish additional monitoring points on the existing adjacent structures, subject to the Commissioner's approval, to adequately monitor and otherwise keep himself informed of the structures' conditions during the work.
3. The Contractor shall restore, to the satisfaction of the Commissioner, by repair or otherwise, the portions of buildings, or their contents, altered by the Contractor in furtherance of his excavation support work. Restoration shall be completed to the conditions which existed prior to the start of work.

END OF SECTION 02260

SECTION 02470 – DRILLED CAISSON PILES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.
- B. The provisions of the Building Code of the City of New York relating to drilled caissons shall govern the work of this section.
- C. Install drilled caissons as shown on the Drawings and specified herein.

1.2 WORK INCLUDED

- A. The work specified in this Section consists of all labor, materials, equipment, storage, handling, and services necessary to furnish and install caisson piles in place in conformity to the lines, grades, dimensions and locations shown on the Contract Drawings, the procedures and tolerances specified herein, and as required for a complete installation.
- B. The work includes all incidental and miscellaneous items not specified under another Section but required for the work of this Section, whether or not specifically referred to herein.
- C. The provisions of the Building Code of the City of New York, section 1810 relating to caisson piles shall govern the work of this section.
- D. This Section includes, but is not limited to, the following items:
 - 1. Casing-installed caisson piles.
 - 2. Any other method used to install caisson piles subject to the Commissioner's approval.
 - 3. All engineering, surveying, layout, monitoring and submittals in connection of the work in this section.
 - 4. Provide down-the-hole video camera for the inspection of the drilled caisson piles.
 - 5. Caisson location plan and survey.
 - 6. As-built survey and drawings.
 - 7. Lateral load tests.

1.3 RELATED SPECIFICATIONS

- A. Section 02260 – Excavation Support and Protection

- B. Section 02200 – Earthwork
- C. Section 03200 - Concrete Reinforcement.
- D. Section 03300 - Cast-in-Place Structural Concrete.

1.4 MEASUREMENT

A. Measurement:

1. Measurement for the caisson pile cased section shall be the total length in place from the top of pile to the top of Class 1c or better rock as specified by Section 1804.2.1 of the Building Code of the City of New York. The length will be measured by the linear foot of caisson pile installed.
2. Measurement for the rock sockets shall be the total length in place from the top of Class 1c or better rock as specified by Section 1804.2.1 of the Building Code of the City of New York to the tip elevation as accepted by the Commissioner performing the special inspection. The length will be measured by the linear foot of caisson pile rock socket installed.
3. The Contractor shall be responsible for correcting caisson piles not constructed within the specified tolerances. Any redesign and analysis needed to verify the adequacy of corrections proposed shall be performed by a Professional Engineer licensed in the State of New York at the Contractor's expense. Signed and sealed drawings and calculations for the proposed corrections shall be submitted to the Commissioner and shall be subject to his approval.

1.5 DEFINITIONS

- A. Sound Rock: For the purpose of payment, elevation of top of sound rock, as specified herein and where noted on the Contract Drawings, is defined as Class 1c or better rock as specified by Section 1804.2.1 of the Building Code of the City of New York. Sound rock shall be verified based on video camera inspection by the Commissioner performing the special inspection.

1.6 REFERENCES

- A. Perform all work in accordance with all applicable City, County, State, and Federal Codes and authorities having jurisdiction.
- B. All work and materials under this section shall conform to the latest revision of the following standard specifications, where not otherwise required by the Contract Documents. The following publications form a part of this Specification to the extent indicated by the specific citations in other paragraphs of this Specification. In case of conflict, the particular requirements of this Specification shall govern, unless indicated otherwise.
 1. American Concrete Institute (ACI)
 - a. ACI 301-05: Specifications for Structural Concrete

- b. ACI 336.1/ 336.1R: Specifications for the Construction of Drilled Piers (ACI 336.1) and Commentary (ACI 336.1R).
- 2. American Society for Testing and Materials (ASTM)
 - a. ASTM A36, Carbon Structural Steel.
 - b. ASTM A53, Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
 - c. ASTM A283, Low and Intermediate Tensile Strength Carbon Steel Plate.
 - d. ASTM C1077, Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
 - e. ASTM D1752, Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - f. ASTM D3740, Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
 - g. ASTM D3966, Standard Test Methods for Deep Foundations Under Lateral Load.
 - h. ASTM A252-10, Standard Specification for Welded and Seamless Steel Pipe Piles
- 3. American Welding Society (AWS)
 - a. AWS D1.1, Structural Welding Code.
- D. "Key Geotechnical Aspects for Spring Street Salt Shed," Technical Memorandum, prepared by Langan, dated 12 February 2013.
- E. All work shall comply with requirements of the Building Code of the City of New York, the New York State Department of Labor, requirements of Occupational Safety and Health Administration (OSHA), New York State Department of Health (NYSDOH), the New York State Department of Environmental Conservation (NYSDEC), the New York City Department of Environmental Protection (NYCDEP), the New York State Department of Transportation (NYSDOT), New York City Department of Transportation (NYCDOT), drawings approved by Port Authority of New York and New Jersey (PANYNJ), and with applicable requirements of all other authorities having jurisdiction.

1.7 SUBMITTALS

- A. The Contractor shall submit the following information at least two weeks prior to the start of the work.
 - 1. Qualifications Submittals: Submit evidence of qualifications including a list of similar projects that the Contractor or his/her specialty Subcontractor has

completed, along with the Owner's contact persons for those projects demonstrating experience meeting the requirements:

- a. Installer: Submit evidence of qualifications including list of at least three (3) project references containing names and phone numbers of Owner's representatives who can verify the Contractor's participation. Include name and experience record of the caisson pile superintendent who will be in charge of caisson pile operations for this project.
 - b. Contractor's Engineer: Submit evidence of qualifications of a Professional Engineer registered in the State of New York, having at least 3 years of experience in the design and construction of caisson piles on similar projects of comparable scope and complexity.
 - c. Testing and inspection agency engaged by the Contractor that performs testing services on concrete materials shall meet the requirements of ASTM C1077.
2. Product Data: For each type of product indicated or specified.
 3. Reinforcement Shop Drawings: In accordance with Section 03200.
 4. Quality Control Submittals
 - a. Design mix for each class of concrete, in accordance with Section 03300.
 - b. Laboratory Test Reports, as specified in Section 03300 .
 - c. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
 - d. Proposed equipment and method of construction to install:
 - i) Caisson pile.
 - ii) Rock socket.
 - e. Design and specification of permanent casing.
 - f. Description of equipment and method of providing and checking the cleanliness of pile bottoms and minimum embedment in rock for consistency with design assumptions prior to placing concrete.
 - g. Method of monitoring verticality of the pile installation and details of proposed corrective measures to be implemented as necessary. For personnel who will perform verticality monitoring, submit documentation of training by the manufacturer in the use of the device to monitor verticality.
 - h. Method of securing and maintaining position of steel reinforcing.
 - i. Method of correction only if location or out-of-plumb tolerances are exceeded in accordance with Paragraph PART 3F.1.

- j. Method of providing construction joint if concrete placement is interrupted.
- k. Method for providing rock socket video inspection using a down-the-hole camera
- l. Provide sample of caisson pile report installation
- m. Provide installation record of each caisson pile to the Commissioner no later than 14 days from the date of the inspection.

5. Lateral Load Test

- a. Submit lateral load test procedures including drawing showing the layout of load frame and reference frame.
- b. Submit identification numbers and calibration curve for the hydraulic jacks and pressure gauge.
- c. The Contractor shall perform load tests in accordance with the ASTM and NYC Building Code requirements.
- d. At the completion of the load tests, submit a report signed and sealed by a Professional Engineer licensed in the state of New York, summarizing the load-deflection response for each pile, the conformance with the Building Code allowable deflection. The report format shall follow the outline in ASTM D3966 (Section 9) where applicable.

6. Pre- and Post-Construction Conditions Survey

- a. Pre- and Post- Construction Conditions Survey to be performed in accordance with Section 02260.

7. Monitoring Plans:

- a. Monitoring plans to be provided in accordance with Section 02260.

8. Contract Closeout Submittals

- a. Record drawings at project closeout.
- b. Report for Caisson Pile socketed in rock
- c. Method of placing concrete, including number, location, and details of tremie pipes.
- d. Provide 5 copies of close-out submittal signed and sealed by Contractor's Engineer and Surveyor no less than 14 days from completion of caisson installation.

1.8 QUALITY ASSURANCE

- A. All work shall comply with requirements of the Building Code of the City of New York, the New York State Department of Labor, requirements of Occupational Safety and Health Administration (OSHA), the New York State Department of Health (NYSDOH), the New York State Department of Environmental Conservation (NYSDEC), the New York City Department of Environmental Protection (NYCDEP), the New York State Department of Transportation (NYSDOT), the New York City Department of Transportation (NYCDOT), the Port Authority of New York and New Jersey (PANYNJ), and with applicable requirements of all other authorities having jurisdiction.
- B. Caisson Pile Standard: Comply with provisions in ACI 336.1/336.1R, unless modified in this Section.
- C. Provide the services of a general contractor or a specialty subcontractor that specializes in the installation of caisson piles and can demonstrate at least three years of relevant experience in the installation of caisson piles under similar conditions.
- D. Design and select caisson pile components under direct supervision of the Contractor's licensed in the State of New York and experienced in design of this work.
- E. Survey Work: Engage a qualified land surveyor or professional engineer licensed in the State of New York to perform surveys, layouts, and measurements for caisson piles and all survey monitoring during construction. Before installation, lay out each caisson pile to lines and levels required. Record actual measurements of each caisson pile including location, pile diameter, bottom and top elevations, deviations from specified tolerances, and other specified data.
 - 1. Record and maintain information pertinent to each caisson pile and cooperate with the Commissioner to provide data for required reports.
- F. Testing Agency Qualifications:
 - 1. For concrete, in accordance with Section 03300.
- G. Welding Standards: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, Section 5. Records of test results of welding procedures not prequalified and copies of records for each qualified welding operator, containing records on positions of welding and types of electrode qualifications, shall be kept by the Contractor and be available for examination by the Construction Manager.
- H. Pre-installation Conference: Conduct caisson pile pre-installation conference at project site.
- I. Installation Records: The following records shall be prepared for the City by the Owner's Engineer. The records shall be completed within 24 hours after each caisson pile installation is completed. The records shall include the following minimum information:
 - 1. Caisson pile materials and dimensions

2. Design loads
3. Installation equipment used (drill rig, hammer, air/water flush, etc.)
4. Caisson pile drilling duration and observations (e.g., flush return) including unusual behavior or conditions during installation
5. Installation time
6. Information on soil and rock encountered, including description of strata, water, etc.
7. Caisson length
8. Approximate surface and final tip elevations
9. Cut-off elevation
10. Any deviations from the intended parameters
11. Concrete pressures attained, where applicable
12. Concrete quantities pumped and concrete factor (actual volume/theoretical volume)
13. Caisson test records, analysis, and details

J. Pre- and post-construction survey

1.9 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

- A. Deliver materials to the project site in such quantities and at such times to assure the continuity of caisson drilling operations, and to maintain the project schedule. Carefully handle caisson materials by means of rope slings or other means so as not to damage the materials.
- B. Casings and reinforcement shall be stored in orderly groups above ground sufficiently blocked to minimize bending stresses. Material exhibiting variations beyond specified limits shall be considered distorted and shall not be used in the work.
- C. Concentrated loads, which occur during stacking or lifting, shall be kept below the level that would produce permanent deformation or overstress of the material. Damaged material will be rejected from use in the performance of the work and shall be removed from the site.

1.10 PROJECT CONDITIONS

- A. The Spring Street Salt Shed site is an approximately 10,000 square feet trapezoidal lot. The site is bordered by Spring Street to the north, West Street to the west, Canal Street to the south, and the Holland Tunnel Ventilation Shaft to the east. The site is presently occupied by a one story brick structure without cellar space that is to be demolished to make way for the proposed salt shed. The north and south tubes of the Port Authority of New York and New Jersey (PANYNJ) Holland Tunnel exist

adjacent to the site to both the north and south beneath Spring Street and Canal Street, respectively. According to PANYNJ drawings obtained for the Garage project and information provided on the structural drawings, the tunnel structures are about 40 to 60 feet below the existing sidewalk grade.

- B. The proposed development is a new Salt Shed structure for the City of New York. The building footprint is on the order of 7,600 square feet; the balance of the site will be covered by a yard. Two below grade concrete tank enclosures will on the eastern portion of the site. The structure is to be on the order of 60-feet-tall at the highest point.
- C. Subsurface Conditions – As of April 2013, subsurface information at the site is not available. Assumptions regarding the subsurface conditions at the site are based on available geologic information and the subsurface information obtained from the Garage site and should be considered preliminary. The general stratigraphy underlying the site likely consists of miscellaneous fill material underlain by organic clay, silty sand, decomposed rock and mica schist bedrock. Detailed descriptions of each subsurface stratum are given below in the order of increasing depth.
1. Fill – A layer of historic fill should be anticipated to about 20 to 30-feet-deep. The fill may consist of sand, silt, brick, concrete, wood, cobbles and boulders and possibly former foundation elements and cribbing.
 2. Soft Organic Clay – An about 5 to 15-feet-thick organic deposit will likely be encountered directly below the fill layer. The organic deposit is expected to consist of black silt and clay containing various amounts of shells and organics.
 3. Silty Sand – A layer of silty sand with varying proportions of mica and gravel is expected to be beneath the fill and/or organic deposits, extending down to the decomposed rock or bedrock. The silty sand thickness is estimated to be about 60 to 90 feet thick.
 4. Decomposed Rock – A layer of decomposed rock, is expected to be encountered beneath the silty sand layer.
 5. Mica Schist Bedrock – The site is likely underlain by fine to coarse-grained mica schist and gneiss bedrock with the depth to bedrock expected to be about 90 to 120 feet below the existing site grades.
 6. Groundwater levels range from elevation -3.6 to -7.2 feet (Borough President of Manhattan Datum) on the adjacent Garage site. It is anticipated that groundwater levels at the Salt Shed site will be affected by water pumping in the Holland Tunnel. Specific groundwater readings for the Salt Shed site can be provided after the subsurface information is available.
- D. Adjacent Structures:
1. The Holland Tunnel Vent Shaft Building is adjacent to the eastern border of the site. The building is approximately 190-feet-long and 50-feet-wide and covers the remainder of the block not occupied by the site. The bottom of the vent shaft building is at about el -50; this is approximately 45 feet below the salt shed top of slab.

2. The Holland tunnel underlies Spring Street and Canal Street. Based on drawings made available by the Port Authority of New York and New Jersey (PANYNJ), the tunnel was constructed with brick and concrete using cut-and-cover methods. Because the proposed construction will be in such close proximity to the existing tunnel structure, PANYNJ approval will be necessary prior to commencement of excavation and foundation construction at the site.
- E. Soil and rock samples taken from the borings will be available for the Contractor's inspection.
- F. The Contractor, by careful examination, shall inform himself 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; the conditions of adjacent structures and utilities and all other matters which can in any way affect the work.
- G. Data on indicated subsurface conditions are not intended as a representation or warranty of continuity of such conditions. It is expressly understood that neither the City nor the Commissioner will be responsible for interpretations or conclusions drawn therefrom by the Contractor.
- H. Prior to bidding this project, the Contractor shall thoroughly explore the ground conditions at the site to be fully informed about the piles and other previous foundation elements which may be left in the ground including those left after demolition of the previous structures in the areas where the caisson piles will be installed. Bidders are invited to perform additional explorations of the site to acquaint themselves with these conditions at no additional cost to the City. No additional compensation will be made after award of contract for any claim related to the pile remnants or any other obstructions in the ground.
- I. The Contractor shall be held to have visited the site and to have familiarized himself with the existing conditions of adjoining utilities and structures. The Contractor is responsible for any conclusions he may draw from this information, including the character of the materials that may be encountered and the degree of difficulty to be expected in the performance of the Work. Neither the City, the Construction Manager nor the Commissioner guarantees the type and quality of the materials to be encountered, or that proportions and character of the various materials will not vary from those indicated.
- J. The Contractor shall make his own deductions of the subsurface conditions which may affect the methods or cost of construction of the work hereunder, and he agrees that he will make no claims for damages or compensations should he find conditions during the progress of the work different from those as calculated and/or anticipated by him, except as are provided under the agreement
- K. If the Contractor finds that the available investigations and reports are not sufficient to determine the nature of the work, the Contractor may undertake his own investigations before or after submission of his bid at his own expense.
- L. Additional borings and other exploratory operations may be performed by the Contractor, at the Contractor's option and following the City's approval. No change in

the Contract Sum will be authorized for such additional exploration undertaken by the Contractor.

- M. 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 concerning the transportation of materials to and from and at the job site and shall secure in advance such permits as may be required.
- N. Examine drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades.
- O. The City reserves the right to change the caisson design due to unforeseen conditions. Any change related to the design change will be compensated at a negotiated price.
- P. Existing Utilities:
 - 1. Prior to commencement of any work, consult available records for existing utilities, and note all conditions and limitations which might affect the work required under this Section.
 - 2. Locate existing underground utilities before installing caisson piles. If utilities are to remain in place, provide adequate means of support, protection and monitoring from damage during caisson pile operations.
 - 3. Survey the location and elevation of all known existing utilities and structures surrounding the project site prior to the start of caisson pile operations. Take all precautionary measures to ensure that those utilities and structures remain the same during the course of caisson piles operations.
 - 4. Do not interrupt existing utilities serving facilities occupied by the City or others, during occupied hours, except when permitted in writing by the Construction Manager and then only after acceptable temporary utility services have been provided. Provide minimum of 48-hour notice to the Construction Manager, and receive written notice to proceed before interrupting any utility.
 - 5. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, adapt drilling procedure if necessary to prevent damage to utilities. Cooperate with the City and utility companies in keeping services and facilities in operation without interruption. The Contractor shall repair damaged utilities at his own cost to satisfaction of utility owner.
 - 6. Demolish and completely remove from site existing underground utilities indicated to be removed and not previously demolished. Coordinate with utility companies for shutoff of services if lines are active.
- Q. Protect structures, underground utilities, and other construction as necessary from damage caused by caisson pile operations.

PART 2 PRODUCTS

Spring Street Salt Shed
Drilled Caisson Piles

02470-10

2.1 STEEL REINFORCEMENT

- A. In accordance with Section 03200 and contract drawings.

2.2 CONCRETE MATERIALS

- A. In accordance with Section 03300 for class of concrete indicated and contract drawings.

2.3 CASINGS

- A. Steel Pipe Casings: ASTM A283, Grade C; or ASTM A36, carbon steel plate, with joints full-penetration welded according to AWS D1.1. Casing thickness to be based on the Contract Drawings.

2.4 CONCRETE MIX

- A. Contractor furnished concrete mixes shall be in accordance with Section 03300 for concrete class indicated, and as specified herein.
- B. Concrete shall have a minimum 28-day unconfined compressive strength as indicated on the Contract Drawings.

2.5 CONCRETE MIXING

- A. In accordance with Section 03300 for concrete class indicated.

2.6 WELDING MATERIALS

- A. All welding materials shall be consistent with the requirements of the metals to be welded.
- B. Welding materials shall be stored to prevent contamination and degradation of electrodes, filler, or shielding materials as per the Manufacturer's specifications.

2.7 EQUIPMENT

- A. Provide equipment, machinery, tools, and other apparatus for drilling, digging, pumping, and hauling. Provide ample standby equipment to prevent flooding, distortion, or caving so that work may be carried on without interruption.
- B. Provide equipment in good working condition. Equipment in poor condition will be rejected and will not be used.
- C. Provide hoisting equipment of sufficient capacity to handle casing, reinforcing steel, and other materials.
- D. Provide sufficient equipment to completely clean bottom prior to concreting and reinforcement installation.
- E. Provide hoses of sufficient size and strength, grout pump, and connections required to perform tremie concrete placement. Provide temporary rubber plugs necessary to prevent mixing of water and concrete in the tremie pipe.

2.8 LOAD TESTS

- A. Hydraulic Jack(s) and Pressure Gauges:
- B. Hydraulic jack(s) shall be equipped with the necessary gauges and piping which shall transmit constant load to the pile.
- C. Hydraulic jack(s) shall be rated for a load capacity of at least 1.5 times the total test load.
- D. Hydraulic jack(s) shall have sufficient ram so that the full test load can be applied at no more than 80 % of its extension.
- E. Pressure gauge shall be able to read pressures accurately to the nearest 50 psi and shall have a range equivalent to at least twice the pressure required to maintain the full test load.
- F. Hydraulic jack(s) and pressure gauge shall be calibrated as a unit by a certified testing laboratory not more than one month prior to their use at the site. A calibration report indicating jack and pressure gauge identification numbers and a calibration curve shall be submitted to the Commissioner at least one week prior to beginning any load tests.
- G. Dial Indicators:
 - 1. Dial gauges shall be capable of reading to the nearest 0.001 inch, and shall have a travel of at least 2 inches.

PART 3 EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, vibration, and other hazards created by caisson pile operations, in accordance with Section 02260 – Excavation Support and Protection. The contractor shall be responsible for all damage to all structural utilities under this section.
- B. Caisson drilling equipment shall have the required torque capacity and downward force capacity for the site conditions to install the caissons to the required depth. Selection of equipment for the successful installation of all caisson piles shown of the Contract Documents shall be the sole responsibility of the Contractor.

3.2 EXCAVATION

- A. Unclassified Excavation: Excavation is unclassified and includes excavation to bearing elevations regardless of character of materials or obstructions encountered.
 - 1. Obstructions: Unclassified excavation includes removal of unanticipated boulders, concrete, masonry, or other and any subsurface obstructions.
- B. Prevent surface water from entering installed piles. Water runoff should be directed to the temporary drainage facilities.

3.3 CAISSON INSTALLATION AND DRILLING

- A. Casings shall be advanced ahead of the drill stem, and a soil plug of at least 2 ft shall be maintained until the casing is seated into bedrock. Drilling fluids, including but not limited to, water, mineral slurry, or polymer slurry shall be provided as necessary to ensure a stable bottom throughout drilling. All methods employed shall be as described in the Contractor's method.
- B. The Contractor's drilling methods shall prevent inflow of soils from beyond the shaft limits (i.e. running sands, etc.) which can result in erosion, destabilization, and subsidence.
- C. The Contractor shall advance and seal the casing into Class 1c or better rock as specified by Section 1804.2.1 of the Building Code of the City of New York and in the Contract Drawings
- D. The caisson piles shall be socketed into the rock, therefore the casing must be fully seated on rock. To be classified as fully seated, the entire cross sectional area of the casing must be seated on rock. The Contractor may select the means and methods necessary for ensuring that the casing and caisson pile are fully seated on rock.
- E. Install closely-spaced caisson piles and those occurring in fragile or sand strata, only after adjacent caisson piles are filled with concrete and allowed to set. Do not drill new piles closer than 10 feet from newly concreted piles until the pile concrete has been in place a minimum of 72 hours.
- F. Tolerances: Construct caisson piles within ACI 336.1/ACI 336.1R tolerances.
 - 1. If location or out-of-plumb tolerances are exceeded, provide corrective construction. Submit design and construction proposals to the Commissioner for review before proceeding.
- G. Drilling Rock Sockets:
 - 1. The work under this Contract includes the drilling of rock sockets of different sizes as shown on the Contract Drawings.
 - 2. It is the responsibility of the Contractor to become completely familiar with the conditions existing at the site.
 - 3. Select appropriate drilling equipment to advance the caisson pile and maintain the pile open to the depth shown on the Contract Drawings. Drilling equipment and methods shall be selected so that the completed pile excavation will have a planar bottom.
 - 4. Conditions may include variable or sloped rock. The Contractor may decide to perform additional borings at his own expense to determine the exact conditions of the slope of the rock.
 - 5. Rock sockets shall be cleaned out after drilling to remove any loose material including sediment and soil which may have accumulated at the bottom of the pile.

- H. The Contractor shall advance the rock socket to the minimum required depth and diameter shown on the Contract Documents. The drilling method should produce a rough surface on the side walls of the rock socket.
- I. Install caisson piles to indicated elevations. Remove loose material from bottom of rock socket.
 - 1. Excavate bottom of caisson piles to level plane within 1:12 tolerance.
 - 2. Drill rock sockets of dimensions indicated.
 - 3. Do not install piles deeper than elevations indicated, unless approved by the Commissioner.
- J. Inspection: The caissons are subject to special inspection as stipulated in Article 1704.8 of the Building Code of the City of New York.
 - 1. Prior to placing steel reinforcement or concrete each caisson pile shall be inspected and tested by the Commissioner responsible for the special inspection. Notify the Commissioner at least 24 hours before excavations are ready for tests and inspections.
 - 2. Down-hole digital video camera will be used to allow inspection of the rock socket by the Commissioner. Caissons shall be flushed with clean water and the remaining water in the caisson will be allowed to sit undisturbed to allow suspended particles to settle prior to video inspection of the rock sockets. If unsuitable bearing stratum is encountered, make adjustments to caisson piles as determined by the Commissioner.
 - 3. Provide and maintain facilities with equipment required for testing and inspecting caisson installation. Cooperate with testing and inspecting personnel to expedite the Work.

3.4 PERMANENT STEEL CASINGS

- A. All casings shall be installed using duplex drilling and internal flushing techniques.
- B. No tapping, pushing, or vibrating of the casing shall be permitted to sit the casing firmly on top of the bedrock.
- C. Install steel casings of minimum wall thickness indicated and of diameter not less than diameter of caisson pile.
 - 1. Install casings as drilling proceeds, to maintain sidewall stability.
 - 2. Fabricate bottom edge of lowest casing section with cutting shoe capable of penetrating rock and achieving water seal.
 - 3. Connect casing sections by continuous penetration welds to form watertight, continuous casing.
 - 4. Remove and replace, or repair, casings that have been damaged during installation and that could impair strength or efficiency of caisson pile.

5. Fill annular void between casing and pile wall with grout.

3.5 STEEL REINFORCEMENT

- A. Once the rock socket has been approved by the Commissioner performing the special inspection, the reinforcing steel shall immediately be placed in the caisson pile. Reinforcing bars shall be deformed and relatively free of scale, oil, or other coatings that would prevent a competent bond with the grout. The reinforcing bars shall be as detailed on the design drawings.
- B. Centralizers shall be provided at 10-ft center maximum spacing on central reinforcement. The uppermost centralizer shall be located a maximum of 5 ft from the top of the caisson pile. Centralizers shall permit the free flow of grout without misalignment of the reinforcement.
- C. The central reinforcement steel with centralizers shall be lowered into the stabilized drill holes to the desired depth without difficulty. Partially inserted reinforcing bars shall not be driven or forced into the hole.

3.6 CONCRETE PLACEMENT

- A. In accordance with Section 03300 for concrete class indicated, and as specified herein.
- B. Place concrete immediately after inspection by the Commissioner of the completed installation, placement of reinforcement, and associated instrumentation if used. Caisson concrete shall be placed within 24 hours of completion of caisson installation.
- C. Provide cooperation and assistance necessary to accurately monitor and record the volume of concrete placed at all times during a concrete placement.
- D. Place concrete by tremie or by pumping. Use at least 8-inch inside diameter tremie pipe or at least 4-inch inside diameter pump pipe, made with watertight joints. Do not use any aluminum components. The inside and outside surface of the tremie shall be clean and smooth to permit both flow of concrete and unimpeded withdrawal during concreting.
 1. Keep the pipe embedded in the concrete at least 5 feet throughout the concrete placement. The tremie pipe shall be raised to the minimum 5-foot embedment depth following the delivery of concrete from each truckload of concrete.
 2. Remove and dispose of the first portion of concrete that reaches the top of the pile. Alternative methods of concrete placement may be submitted for review and approval.
- E. If, on arrival at the job site, the concrete slump is less than that required, the slump may be increased as follows:
 1. No concrete admixture shall be used, but water may be added to the concrete mix under the supervision of a Contractor-furnished qualified technician. Minimum qualification is a valid ACI or MCIB concrete field technician license. The following restrictions apply when this option is selected:

- a. Add water to concrete only in a staging area before concrete truck backs up to tremie. Add water only once to a truck. No water can be added after more than 0.5 cubic yards have been removed from the truck. The amount of water added must be accurately measured and recorded immediately. A maximum of 2 gallons of water can be added to each cubic yard of concrete; however, only the amount needed to reach the desired slump shall be used, and a water-cement ratio of 0.45 shall not be exceeded.
 - b. Immediately after adding water, turn the drum an additional 30 revolutions or more if necessary, at mixing speed, until the concrete is thoroughly mixed. The technician shall then sample the concrete from the beginning of the load (not the middle third of the load) and measure the slump.
 - c. The measured slump shall be between 7 and 9 inches.
 - d. Discharge concrete within 90 minutes after initial mixing or before the drum has revolved 300 revolutions.
- F. Place concrete in continuous operation and without segregation immediately after inspection and approval of pile by the Commissioner.
- G. Screed concrete at cutoff elevation level and apply scoured, rough finish. Where cutoff elevation is above the ground elevation, form top section above grade and extend pile to required elevation.
- H. The Contractor shall propose a method for approval by the Commissioner of providing a construction joint if concrete placement is unavoidably delayed more than one hour. The method shall address leveling the top surface of concrete, cleaning surface laitance, roughening the surface, providing a bonding agent before placing remainder of concrete. Obtain approval before commencing work.

3.7 LATERAL LOAD TEST

- A. General
1. The intent of this part of the test package is to evaluate and verify lateral load response used in the design of piles. The Contractor shall provide a minimum of two lateral load tests to a capacity of 200 percent of the design lateral load.
- B. Load tests shall be administered and supervised by a Licensed Professional Engineer in New York engaged by the City of New York.
1. The test locations shall be agreed upon with the Commissioner. At a minimum one test shall be performed in an area of shallow rock, and one test shall be performed in an area of deepest rock.
- C. Testing Standards
1. Pile lateral load testing is to be carried out in accordance with ASTM D3966 for laterally loaded piles.

- D. Load Schedule –The load schedule shall be in accordance with ASTM D3966 Section 6.1 Standard Loading.
- E. Pile Head Measurements
 - 1. Measure pile head movement with one dial gauge capable of reading to the nearest 0.001 inch. Dial gauges shall have a travel of at least 2 inches. Dial gauges shall be mounted on an independent steel test frame to prevent relative movement during the load test.
 - 2. Establish a separate mirror, wire, scale set-up, with scale capable of measuring to the nearest 0.02 inch.
 - 3. Provide independent survey level measurements of the pile using optical level survey equipment capable of reading to the nearest 0.005 ft.
- F. Allowable Design Capacity
 - 1. The allowable design capacity shall be:
 - a. Fifty (50) percent of the applied lateral load resulting in 1 inch of gross lateral movement measured at the pile head.
 - b. The City of New York's Commissioner who will be a Licensed Professional Engineer in the State of New York shall prepare and submit a load test report to project expeditor for review and filing with the Building Department.

3.8 MONITORING

A. General

- 1. Vibration and optical survey monitoring of surrounding structures to be performed by others in accordance with Section 02260.
- 2. Drilling shall not result in ground vibrations exceeding 2-inches per second as measured at the closest site boundary line. Contractor shall be prepared to alter drilling methods to reduce vibrations in the event of exceedance of the above referenced maximum permissible value.

B. Verticality

- 1. Inclination of the caisson shall be checked prior to initiation of drilling by optical surveying techniques or as approved by the Commissioner.
- 2. The inclination of the casing (above and below grade) shall be checked periodically during drilling to ensure that deviations are within acceptable tolerances in accordance with the Contractors approved method statement and procedures.

3.9 TOLERANCES

- A. Shafts shall be vertical and with minimum diameter as indicated on the Contract Drawings.
- B. Maximum permissible deviation of center of top of any caisson from required location at cut-off shall be 3-inches. Shaft shall not be out of plumb more than 2 percent of shaft length, based on the final centers at top and bottom of caisson. Tolerances shall be determined in the field by optical survey, performed by a Licensed Surveyor retained by the Contractor.
- C. Damaged caissons, and caissons drilled outside the required drilling tolerances, will not be accepted.
- D. Caissons rejected after drilling shall be cut-off and additional caissons drilled to replace the lost capacity as required by the Commissioner.
- E. If tolerances are exceeded, design and furnish at no additional cost all additional or corrective construction to compensate for excessive eccentricity. Corrective construction shall be submitted for approval by the Commissioner. The Contractor shall be responsible for all costs associated with the review of the corrective design and construction by the Commissioner.
- F. The Contractor shall be responsible for correcting caisson piles not constructed within the specified tolerances. Any redesign and analysis needed to verify the adequacy of corrections proposed shall be performed by a Professional Engineer licensed in the State of New York at the Contractor's expense. Signed and sealed drawings and calculations for the proposed corrections shall be submitted to the Commissioner and shall be subject to his approval.
- G. Approvals: The Commissioner will make final approval of caisson shaft holes and authorize subsequent concrete placement.

3.10 CLEAN-UP

- A. All debris resulting from excavation and drilling, removal of obstructions, cut-off butts, and any material not to remain as part of the construction is to be removed and disposed of off-site by the Contractor in a legal manner at no additional cost to the City of New York.
- B. The site shall be cleaned at frequent intervals and no material shall be stored on the site in a manner which would obstruct the easy access of equipment and personnel. Stockpiling of material will not be permitted.

END OF SECTION 02470

SECTION 02503 - INSTALLATION OF BURIED PIPELINES

PART 1 - GENERAL

1.1 SUMMARY

- A. Installation of all underground pipelines as shown on the Contract Drawings. Provide pipeline materials, coatings and linings as specified and pipe of the types, sizes and classes shown or specified. Furnish and install connections, including adapters and closure pieces, as required to connect pipelines to existing pipelines, or buried structures. Sleeves and castings for wall penetrations are to be provided for installation.
- B. Related Specifications:
 - 1. Division 2 Section "Leakage Tests."
 - 2. Division 15 Section "Interior and Exposed Piping Schedules."
 - 3. Division 15 Section "Ductile Iron Pipe".

1.2 REFERENCES

- A. ASTM D 2774 - Practice for Underground Installation of Thermoplastic Pressure Piping.
- B. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
- C. ASTM C 361 - Specification for Reinforced Concrete Low-Head Pressure Pipe.
- D. ASTM A 307 - Specification for Carbon Steel Bolts and Studs, 60000 psi Tensile.
- E. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, C25, 125, 250, 800.
- F. ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges.
- G. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- H. ASTM A 139 - Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over).
- I. AWWA C115 - Flanged Ductile-Iron Pipe with Threaded Flanges.
- J. AWWA C206 - Field Welding of Steel Water Pipe.
- K. ASTM E 165 - Practice for Liquid Penetrant Examination.
- L. ASTM E 709 - Practice for Magnetic Particle Examination.
- M. New York City Construction Codes.
- N. City of New York Department of Environmental Protection (NYCDEP) Sewer Design Standards.
- O. NYCDEP Bureau of Water Supply Standard Water Main Specifications.

1.3 DESIGN REQUIREMENTS

- A. Reinforced concrete pipe shall conform to the following requirements: Use diameter, wall thickness, compressive strength of concrete and area of circumferential reinforcement as prescribed for Classes I to IV in Tables 1 to 5 in ASTM C76, except do not use Wall A thickness, elliptical reinforcing cages or quadrant reinforcing mats. Do not substitute modified designs for designs shown in the tables.
- B. Pipeline installations for storm and sanitary drainage shall conform to NYCDEP Sewer Design Standards and NYC Construction Codes Sections P110.0 – Storm Drainage Piping and P108.0 – Sanitary Drainage Piping, respectively.
- C. Pipeline installations for city water shall conform to NYCDEP Bureau of Water Supply Standard Water Main Specifications and NYC Construction Codes Section P107.0 – Water Supply and Distribution.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Transportation and Delivery: Take every precaution to prevent injury to the pipe during transportation and delivery to the site.
- B. Loading and Unloading: Take extreme care in loading and unloading the pipe and fittings.
 - 1. Work slowly with skids or suitable power equipment, and keep pipe under perfect control at all times.
 - 2. Under no condition is the pipe to be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe or coating.
- C. Sling: When handling the pipe with a crane, use a suitable sling around the pipe.
 - 1. Under no condition pass the sling through the pipe.
 - 2. Use a nylon canvas type sling or other material designed to prevent damage to the pipe and coating.
 - 3. When handling reinforced concrete pipe or uncoated steel or ductile iron pipe, steel cables, chain or like slings are acceptable.
- D. Damaged Piping: If in the process of transportation, handling, or laying, any pipe or fitting is damaged, replace or repair such pipe or fittings at the Contractor's expense.
- E. Blocking and Stakes: Provide suitable blocking and stakes installed to prevent pipe from rolling.
 - 1. Obtain approval for the type of blocking and stakes, and the method of installation.
- F. Storage for Gaskets: Store gaskets for pipe joints in a cool place and protect gaskets from light, sunlight, heat, oil, or grease until installed.
 - 1. Do not use any gaskets showing signs of checking, weathering or other deterioration.
 - 2. Do not use gasket material stored in excess of six months without approval.

1.5 FIELD CONDITIONS

- A. Repair of Existing Piping to be Maintained: Rebed, in compacted select fill material, existing pipes which cross over the new pipe or which cross under the new pipe with less than 12 inches clear vertical separation. Compact the bedding to densities required for new pipeline construction and extend bedding below the sewer to undisturbed earth. Reconstruct sewers damaged by pipeline construction.
1. Furnish and install all materials and do all work necessary for the reconstruction or repairs of sanitary sewers and services.
 2. Provide pipe for reconstruction of existing pipe meeting the appropriate specification requirements.
 3. Provide pipe of the same size as the existing sewer or when the same size is not available, use the next larger size of pipe. Obtain approval of joints made between new pipe and existing pipe.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install all piping in accordance with the manufacturer's recommendations and approved shop drawings and as specified herein and in Division 15 Section "Interior and Exposed Piping Schedules."
1. Arrange miscellaneous pipelines, which are shown in diagram form on the Plans, clear of other pipelines and equipment.
- B. Earthwork: The Contractor shall perform all earthwork including excavation, backfill, dewatering, bedding, compaction, shoring and bracing, grading, and restoration of surfaces, and seeded areas disturbed under his contract.
- C. Pipe Laying – General:
1. Proper and suitable tools and appliances for the safe, convenient handling and laying of pipe shall be used and shall agree with manufacturer's recommendations. At the time of laying, the pipe shall be examined carefully for defects, and should any pipe be discovered to be defective after being laid, it shall be removed and replaced with sound pipe.
 2. For pipelines intended for gravity flow, begin pipeline laying at the low end of a run and proceed upgrade.
 3. Generally, lay all pipe with bells pointing ahead.
 4. Carefully place each pipe and check for alignment and grade.
 5. Make adjustments to bring pipe to line and grade by scraping away or filling in select fill material under the body of the pipe.
 6. Wedging or blocking up the pipe barrel shall not be permitted.
 7. Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely shove the pipe home.
 8. As the work progresses, clean the interior of pipelines of all dirt and superfluous materials of every description.

9. Keep all lines absolutely clean during construction.
10. Lay pipelines accurately to line and grade. The interior surface shall be smooth and uniform.
11. Use suitable fittings where shown and at connections or where grade or alignment changes require offsets greater than those recommended and approved.
12. Close off all lines with bulkheads when pipe laying is not in progress.
13. Furnish and install connections, including adapters and closure pieces as required, to connect pipelines to existing pipelines.

D. Pipe Laying - Trenches:

1. Trench excavation and backfill shall be performed by the Contractor.
2. Lay all pipelines in trench excavations on select fill bedding, Class 25 concrete cradle or other foundations as shown, specified or ordered in writing.
3. Properly secure the pipe against movement and make the pipe joints in the excavation as required.
4. Carefully grade and compact pipe bedding.
5. Bell Holes:
 - a. Cut out bell holes for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.
 - b. Thoroughly tamp bell holes full of select fill material following the making of each joint.
6. Dry Trench Bottoms: Lay pipe only in dry trenches having a stable bottom.
 - a. Where groundwater is encountered, make every effort to obtain a dry trench bottom.
 - b. If a dry trench bottom has not been obtained due to improper or insufficient use of all known methods of trench dewatering, then the order to excavate below grade and place sufficient select fill material, crushed stone, or Class D concrete over the trench bottom may be given.
 - c. If all efforts fail to obtain a stable dry trench bottom and it is determined that the trench bottom is unsuitable for pipe foundation, obtain an order, in writing, for the kind of stabilization to be constructed.

E. Other Foundations: Install pipelines laid on other types of foundations as specified for such other foundations or as ordered in writing.

F. Jointing Concrete Pipe with Rubber Gaskets:

1. Preparation of Joint Surfaces: Before joining concrete pipe using flexible rubber gaskets, wipe clean the joint surfaces of both the bell and spigot ends. Repair any lumps, projections, burrs, or chips which would interfere with the proper compression of the gasket.
2. In making O-ring rubber gasketed joints, lubricate the gasket and the pipe socket with an approved rubber gasket lubricant, and stretch the gasket over the spigot and place gasket accurately in position.
3. The position and condition of the gasket shall be examined from the inside of the pipe before successive pipe lengths are installed. If an unsatisfactory condition is located, the

pipe shall be taken out and the operation of drawing the pipe together repeated with a new gasket.

4. Carefully center the spigot end in the socket of the preceding pipe to avoid displacement of the gasket and draw the pipe home fully compressing the gasket with an approved tackle and apparatus.
5. Prior to the use of such apparatus and method, demonstrate to the Commissioner for approval the effectiveness and practicability of the proposed method of drawing the joints home.
6. Curve Offset: Construct curves for reinforced concrete pipelines with standard pipe where the opening of the joint on the outside of the curve is less than 1/2 inch.
7. Curve Fittings: Where greater opening of the joint would be required, construct curves using beveled or radius pipe with standard joints, short lengths of pipe, or plain end radius pipe with cast concrete collar joints, or continuous concrete encasement; or by monolithic construction.

G. Jointing Concrete Pipe at Structures:

1. At manholes and other structures in precast concrete pipelines, the construction may be of monolithic concrete. Submit details of such joints to the Commissioner for approval.
2. Where provisions for future connections are required, provide similar joints and coat with an approved asphaltic compound for protection. If necessary, in the opinion of the Commissioner, place a suitable collar entirely around the pipe at all such joints.

H. Concrete Pipeline Joint Finishing: Provide the following finished joints for steel end ring concrete pipelines with rubber gaskets:

1. Exterior Joint Grouting:

- a. Grout joints for concrete pipelines using rubber gaskets and steel end rings on the outside with cement mortar composed of 1 part Type II portland cement to 1 part sand by volume.
- b. Thoroughly mix the materials to produce a uniform mortar with all aggregate particles well coated.
- c. In grouting the exterior joint, use a cloth diaper to encase the outside diameter of the bell of the pipe and adequately straddle the joint recess to keep out dirt and to serve as a form for grouting.
- d. Fill the joint space with cement mortar which is just thin enough to run around the joint.
- e. Leave the diaper in place permanently.
- f. Before the mortar has taken its initial set, examine the diaper, and if not completely filled, force additional mortar into the joint.

2. Interior Joint Grouting

- a. Place cement grout in the interior annular joint opening of all steel end ring concrete pipe for pipe sizes 30 inches and larger in diameter.
- b. Perform interior joint grouting in two phases:
 - 1) Immediately following pipe laying
 - 2) After backfilling the entire pipeline is complete

3. Joints for Concrete Pipelines with all-concrete pipe ends
 - a. Do not grout joints on the outside of the joint for concrete pipelines using rubber gaskets with all-concrete pipe ends.
 - b. Fill the interior annular joint opening with cement mortar and trowel smooth for all pipe 30 inches and larger.
4. Alternative to Grouting
 - a. In place of grouting, use a joint filler consisting of a preformed loop of urethane foam impregnated with unhydrated Portland cement to fill the outside joint recess in prestressed lined cylinder pipe.
 - b. Place the loop, sized to fit the spigot end of the pipe, around the spigot ring behind the gasket groove.
 - c. Draw the pipe joined as described herein home, compressing the rubber gasket and forcing the urethane foam loop to fill the outside annular joint recess.

I. Ductile Iron Pipe Mechanical Joints:

1. Assembly: In making up mechanical joints, center the spigot in the bell.
 - a. Thoroughly brush the surfaces with which the rubber gasket comes in contact with a wire brush just prior to assembly of the joint.
 - b. Brush lubricant over the gasket just prior to installation.
 - c. Place the gasket and gland in position, bolts inserted, and the nuts tightened fingertight.
 - d. Tighten the nuts with a torque wrench so that the gland is brought up toward the pipe evenly.
 - e. Prime all bolts by dipping with a bituminous coating, except the threads. Coat threads immediately prior to installation of nuts.
2. Torques: Apply the following range of bolt torques:

<u>Size</u> <u>Inches</u>	<u>Range of</u> <u>Torque - ft. lbs</u>
5/8	45 - 60
3/4	75 - 90
1	85 - 100
1-1/4	105 - 120

3. Remaking of Joints: If effective sealing is not obtained at the maximum torque listed above, disassemble and reassemble the joint after thorough cleaning.

J. Ductile Iron Pipe Rubber Gasket Joints:

1. Assembly: In making up the rubber gasket joint, brush the gasket seat in the socket thoroughly with a wire brush and wipe the gasket with a cloth.

- a. Place the gasket in the socket with the large round end entering first so that the groove fits over the bead in the seat.
 - b. Apply a thin film of lubricant to the inside surface of the gasket that will come in contact with the entering pipe.
 - c. Brush the plain end of the pipe to be entered thoroughly with a wire brush and place it in alignment with the bell of the pipe to which it is to be joined.
 - d. Exert sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket to make the joint.
2. Positioning: Before proceeding with backfilling, feel completely around the joint using a feeler gauge to confirm that the gasket is in its proper position.
- a. If the gasket can be felt out of position, withdraw the pipe and examine the gasket for cuts or breaks.
 - b. If the gasket has been damaged, replace it with a new one before re-installing the pipe.
- K. Ductile Iron Pipe and Steel Pipe Joint Lining: For cement mortar lined ductile iron pipe greater than 30 inches in diameter, fill all interior joint recesses with mortar and make recesses smooth and flush with adjacent pipe interior walls in accordance with AWWA C205, Appendix A.2. For cement mortar lined steel pipe 8 inches in diameter and larger, except sleeve type coupling joints, fill all interior joint recesses with mortar and make recesses smooth and flush with adjacent pipe interior walls in accordance with AWWA C205, Appendix A.2. Use Type II portland cement in mortar for interior joint finishing of wastewater pipelines.
- L. Connections to Existing Sewers and Manholes:
1. Arrange connections to existing city sewers and manholes with the NYCDEP Bureau of Water and Sewer Operations.
 2. Provide connections of size and in locations as indicated on the Contract Drawings.
 3. Provide connections and materials meeting the requirements of the NYCDEP.
- M. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected.
1. Remove bulkheads encountered in connecting sewers or structures included in this Contract, or in pipelines or structures previously built, when they are no longer needed or when ordered.
- N. Sleeve Type Couplings: For sleeve type couplings, equally tighten diametrically opposite bolts on the connection so that the gaskets will be brought up evenly all around the pipe.
1. Torque Wrenches: Do the final tightening with torque wrenches set for the torque recommended by the coupling manufacturer.
- O. Concrete Cradle:
1. General: When a concrete cradle is shown, specified, or ordered in writing, lay the pipe to grade by supporting each section on concrete blocks located near each end.

- a. Shape the tops of the blocks to fit the outside diameter of the pipe.
 - b. Set the blocks approximately 3/8 inch low.
 - c. Place the pipe on the blocks on a layer of stiff mortar of sufficient thickness to bring the pipes to exact grade.
2. Cradle: Place Class 25 concrete cradle, on one side only, until it has risen above the invert on the other side, after which deposit the remainder of the concrete on both sides to the pipe spring line.
 - a. Prevent movement of the pipe during concrete placement.
 - b. Conform concrete to Division 3 Section "Cast-In-Place Structural Concrete."
 3. Backfill: Placing of the pipe on supports or cradles under the pipe does not relieve the Contractor from the work of providing a firm and continuous bed for the pipe by compacting select fill bedding under and around the pipe and between the cradles.
- P. Concrete Encasement: When concrete encasement is to be provided, as shown, specified, or ordered in writing, lay and block the pipeline and place concrete as specified for concrete cradle.
1. Continue the placing of concrete to provide complete encasement to the dimensions shown, specified, or ordered.
 2. Conform concrete to Division 3 Section "Cast-In-Place Structural Concrete."
- Q. Coatings and Linings: Provide coatings and linings as specified on the Buried Pipe Schedule in this section and in accordance with the requirements of Division 15 Sections "Ductile Iron Pipe" and "Steel and Stainless Steel Pipe."
- R. Valve Box Setting: Install valve boxes vertical and concentric with the valve stem.
1. Satisfactorily reset any valve box which is moved from its original position, preventing the operation of the extension valve stem.
 2. Replace any extension valve stem which has been damaged so that it can be operated.
 3. Install new valve boxes in accordance with NYCDEP Bureau of Water Supply Standard Water Main Specifications.
- S. Jacking:
1. General: Perform jacking as shown. After jacking is completed, seal the ends of the casing pipe with brick masonry.
 2. Jacking Pit: Provide jacking pit of adequate length to provide room for the jacking frame, the jacking head, reaction block, the jacks, rig, and jacking pipe.
 - a. Construct the pit to be sufficiently wide to allow ample working space on each side of the jacking frame and sufficiently deep so that the invert of the pipe will be at the elevation desired for the completed line when placed on the guide frame.
 - b. Tightly sheet the pit and keep it dry at all times.
 - c. Provide adequate protective railings at the top of the pit at all times.
 3. Jacking Frame: Design the jacking frame so that it applies a uniform pressure over the entire pipe wall area of the pipe to be jacked.

4. Reaction Blocks: Adequately design the reaction blocks to carry the thrust of the jacks to the soil without excessive soil deflection in a manner which avoids any disturbance of adjacent structures or utilities.
5. Hydraulic Jacks: Use hydraulic jacks in the jacking operation, and take extreme care to hold the casing pipe to exact line and grade.
6. Advance Excavation: Advance excavation by augering.
7. Casing Pipe: Furnish steel casing pipe, unless otherwise specified, conforming to ASTM A 139 with wall thicknesses and pipe diameters shown on the Plans. Provide full penetration butt welded pipe joints.
8. Fill Material: Use fill material, consisting of 1-1/4 pounds of Bentonite per gallon of water, during jacking to fill any voids between the casing pipe and the earth.

T. Erection:

1. Anchorage: Place anchorage of pipelines and appurtenances as shown or as ordered.
 - a. Accomplish anchorage by placing concrete to the dimensions shown between undisturbed earth and the fitting to be anchored.
2. Valve Setting: Erect valves carefully in their proper positions, free from all distortion and strain, with flanged, mechanical or push-on joints, and pack and leave in satisfactory operating condition.
3. Short Tunnel Construction: Joint pipes to be placed in short tunnels prior to being placed into position.
 - a. Place the pipe into position in a manner which keeps joints tight.

- U. Restoration and Temporary Pavement Work: All restoration and temporary pavement work shall be completed within 30 working days after the installation of underground piping is completed.

3.2 FIELD QUALITY CONTROL

- A. Testing: Test pipelines in accordance with Division 2 Section "Leakage Tests."
1. Test valves in place, as far as practicable, and correct any defects in valves or connections.
- B. Inspection: Clean, inspect, and examine each piece of pipe and each fitting and special for defects before it is installed.
1. Cut away any lumps or projections on the face of the spigot end or the shoulder.
 2. Do not use any cracked, broken, or defective pieces in the work.
 3. If any defective piece should be discovered after having been installed, remove and replace this piece with a sound piece in a satisfactory manner at no increase in Contract Amount.

3.3 CLEANING

- A. General: Thoroughly clean all pipe before it is laid and keep it clean until it is accepted in the completed work.

- B. Removal of Materials: Exercise special care to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any particles are discovered before the final acceptance of the work, remove and clean the pipe.

3.4 SCHEDULE

- A. Abbreviations used in the schedule are:

- 1. Pipe Materials

- a. DI Ductile Iron
- b. GALV Galvanized
- c. RCP Reinforced Concrete Pipe
- d. SS Stainless Steel
- e. FRP Fiberglass Reinforced Epoxy Resin

- 2. Joints

- a. B&S Bell and Spigot
- b. CLAM Clam Shell
- c. RPOJ Restrained Push-on Joint
- d. THD Threaded

- 3. Coatings and Linings

- a. BC Bituminous – Cold Application
- b. CE Concrete Encased
- c. CL Cement-Mortar Lined
- d. E Epoxy
- e. P Painted
- f. PEW Polyethylene Wrapped

- B. Schedule: Provide products as listed in the following schedule.

BURIED PIPING SCHEDULE							
Service	Code	Size (inches)	Pipe Material	Protective Coatings		Pipe Class/ Wall Thickness/ Schedule	
				Interior	Exterior ⁽¹⁾		
Storm Sewer	ST	4 to 12	DI	-		Test Pressure (psig) ⁽²⁾ 25	Remarks Leak test per Gen Spec 02505. Zero allowable leakage.
Force Main	FM	3	DI	CL	POJ	50	See Note 2

Notes:

1. Encase all piping below concrete structures with concrete.
2. Pressure and leakage testing requirements and procedures are specified in Division 2 Section "Leakage Tests."
3. All connections to valves and equipment shall be made with flanged joints.
4. Leak test storm sewers in accordance with gravity sewer testing procedures described in Division 2 Section "Leakage Tests."

END OF SECTION 02503

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SECTION 02504 - SANITARY AND STORM SEWER STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Requirements for furnishing and installing precast and cast-in-place concrete drainage structures including, but are not limited to: manholes, inlets, catch basins, area drains, pipe cradles and encasements, splash pads, trench drains, clean outs, rain water collection tanks and other structures in sanitary sewers and storm sewers including all appurtenances outside the building.
- B. Related Specifications:
 - 1. Division 2 Section "Leakage Tests."
 - 2. Division 2 Section "Installation of Buried Pipelines."
 - 3. Division 3 Section "Cast-in-Place Structural Concrete."
 - 4. Division 15 Section "Ductile Iron Pipe".
 - 5. Division 15 Section "Hangers and Supports."
 - 6. Division 15 Section "Piping Insulation."
 - 7. Division 15 Section "Interior and Exposed Piping Schedules."

1.2 REFERENCES

- A. ASTM C32 - Sewer and Manhole Brick (Made for Clay or Shale).
- B. ASTM C39 - Compressive Strength for Cylindrical Concrete Specimens.
- C. ASTM C78 - Flexural Strength of Concrete.
- D. ASTM C139 - Concrete Masonry Units for Construction of Catch Basins and Manholes.
- E. ASTM C140 - Methods of Sampling and Testing Concrete Masonry Units.
- F. ASTM C144 - Aggregate for Masonry Mortar.
- G. ASTM C279 - Chemical-Resistant Masonry Units.
- H. ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets (Metric).
- I. ASTM C478 - Precast Reinforced Concrete Manhole Sections.
- J. ASTM C666 - Freeze Thaw Stability of Concrete Specimens.
- K. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
- L. AWWA C302 - Reinforced Concrete Pressure Pipe, Non-Cylinder Type.

- M. New York City Department of Environmental Protection (NYCDEP) Sewer Design Standards.

1.3 DESIGN REQUIREMENTS

- A. Except as otherwise shown or specified, construct sewer manholes and catch basins of precast reinforced concrete sections conforming to ASTM C478.
- B. Unless otherwise shown, manholes and catch basins shall be built in accordance with the Sewer Design Standards of the NYCDEP, except that they shall be constructed without steps.

1.4 SUBMITTALS

- A. Contractor shall submit working drawings including all components as a complete system and material specifications for the approval.
- B. Contractor shall submit shop and field test reports of concrete samples tested in an approved laboratory.

1.5 DELIVERY, STORAGE AND HANDLING

- A. General: Take every precaution to prevent injury to the structures during transportation and unloading. Unload manhole sections and other precast items using skids, pipe hooks, rope slings, or suitable power equipment, if necessary, and keep the items under control at all times. Do not allow the items to be dropped, dumped or dragged under any conditions.
- B. Damaged Section: If any precast manhole section or other structural unit is damaged in the process of transportation or handling, reject and immediately remove the item from the site, and replace it at no increase in Contract Amount.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
- B. Precast Manholes:
 - 1. Monarch Precast Concrete Corp.
 - 2. Precast Concrete Sales Company.
 - 3. Long Island Precast, Inc.
- C. Precast Inlets:
 - 1. Monarch Precast Concrete Corp.
 - 2. Rotondo/Penn-Cast Products, Inc.
 - 3. Precast Concrete Sales Company.
- D. Precast Catch Basins:

1. Monarch Precast Concrete Corp.
2. Rotondo/Penn-Cast Products, Inc.
3. Long Island Precast, Inc.
4. Precast Concrete Sales Company.

E. Polymer Concrete Trench Drain:

1. ACO Polymer Products, Inc.
2. ABT, Inc.
3. Or approved equal.

F. Clean Out:

1. J.R.Smith Mfg. Co. Inc.
2. WATTS.
3. Or approved equal.

2.2 MATERIALS

- A. Concrete, Steel Reinforcement and Aggregates: For precast manholes, catch basins, inlets, and other sanitary and storm sewer structures, reinforced concrete, cementitious materials, aggregates and steel reinforcement shall conform to the requirements of ASTM C478. If concrete rings are used for adjusting manhole frames to grade, they shall conform to the requirements of ASTM C139. For cast-in-place structures, these materials shall conform to Division 3 Section "Cast-In-Place Structural Concrete."
- B. Brick: If brick is used for adjusting manhole and catch basin frames to grade, it shall conform to ASTM C32, Grade MS, with minimum dimensions of 2-1/4 by 3-1/2 by 7-1/2 inches. Brick shall be new, solid, sound, hard burned throughout and uniform in size and quality.
- C. Mortar: Provide mortar that is composed of one part Type II Portland cement or Portland pozzolan cement to two parts sand. Sand shall be natural sand that conforms to the requirements of ASTM C144.
- D. Frames and Covers: Frames, covers, gratings and miscellaneous metal castings shown in the NYCDEP Sewer Design Standards or on the Contract Drawings for installation on manholes, catch basins, trench drains, cleanouts and other sanitary structures shall be gray iron unless otherwise specified in the drawing. Grating for trench drains shall be compatible with the trench drain manufacturer's systems and recommendations.
 1. At all locations not within a structure, the design loading shall be a standard AASHTO H-25 truck loading, unless otherwise noted.
 2. Gray Iron castings shall conform to the requirements of ASTM A48 and NY Spec 20-I-1 and manhole frames and covers shall be Class 25B, 30B or 35B with Class 25B, having a tensile strength of 25 ksi, being the lowest class utilized.
 3. Covers and grating shall be provided with matching frames. Cover shall fit flush with the surrounding finished surface. The cover shall not rock or rattle when loading is applied.

4. All castings shall be erected to accurate grades and alignment and when placed in concrete or other surrounding materials, shall be carefully supported to prevent movement during placement of concrete or other materials.

- E. O-Ring Rubber Gaskets: Provide O-ring rubber gaskets conforming to ASTM C443 for joining manhole sections.
- F. Pipe Connections between pipes and cast in place manholes: Provide one size larger metal penetration sleeves at the connection between pipes and cast in place manholes to secure the pipe at the specified invert elevation. Grout the annular gap between sleeve and pipe to provide water tight connection.

2.3 CONSTRUCTION OF MANHOLES

- A. Manhole Base Section: Unless otherwise shown, provide manhole base sections consisting of a base riser section with an integral floor. When benches are made at the manufacturing site, provide concrete used for benched inverts conforming to the requirements for concrete used for precast sections. When benches are made in the field, Class 45 concrete may be used. Benches shall be float finished and sloped to drain.
- B. O-ring Joints: Join riser, cone and flat slab top sections with O-ring rubber gasket joints or self-sealing butyl gaskets, as shown in the NYCDEP Sewer Design Standards. Fill voids in the joints completely with mortar after assembly of the sections.

2.4 SOURCE QUALITY CONTROL

- A. Concrete Strength: Manhole sections will be inspected and tested by an independent, certified testing laboratory, retained by the Commissioner, to establish the strength of the concrete and the adequacy of curing, to certify the date that the sections were cast and to confirm that the reinforcing steel has been properly placed. This inspection and testing will be performed by the laboratory at the manufacturing plant prior to shipment.
 1. A minimum of one set of three cylinders will be taken each day that manhole sections are cast, with batch samples to be designated by the laboratory representative. At least one set of cylinders will be taken from each 9 cubic yards of concrete used in manhole section construction. These samples will be tested for strength. If the samples fail to meet specified minimum concrete strength requirements, all manhole sections manufactured from the concrete from which the cylinders were made will be rejected.
 2. The City reserves the right to core manholes either at the job site or point of delivery to validate strength of concrete and placement of steel. If cores fail to demonstrate the required strength or indicate incorrect placement of reinforcing steel, all sections not previously tested will be considered rejected until sufficient additional cores are tested, at no increase in Contract Amount, to substantiate conformance to these requirements.
- B. Acceptance of flat slab tops will be based on the tops passing a proof-of-design test in accordance with ASTM C478. One flat slab top for each design shall be tested.

2.5 PRECAST PRODUCTS

- A. Unless otherwise shown or specified, precast concrete products shall be used for sanitary and storm sewer structures.

- B. The number of joints in manhole and catch basin riser sections shall be kept to a minimum by using sections 8'-0" long in so far as possible. Joints shall be tongue and groove type conforming to AWWA C302, with continuous steel reinforcement in the tongue and bell.
- C. Wet-cast methods only shall be used. Forms shall leave the surfaces smooth and free of irregularities or honeycombing.
- D. Unless otherwise shown or specified, the following design loadings shall be used with 30 percent impact allowance in roads and 15 percent elsewhere.
 - 1. Earth = 130 PC.
 - 2. Wheel = H-20.
- E. Unless otherwise shown or specified, wall thickness for manholes and catch basins shall be not less than:
 - F. 5 inches for walls
 - 1. 8 inches for top slab
- G. No more than two (2) tapered lifting holes shall be provided per section of manhole or lifting holes shall be filled with tapered rubber plugs.
- H. The point of intersection (P.I.) of pipes shall be marked with a pin in the manhole floor.
- I. The date of manufacture and the manufacturer's trademark shall be marked inside each manhole and catch basin barrel.

2.6 POLYMER CONCRETE TRENCH DRAINS

- A. The trench drain shall be formed from high strength, durable polymer concrete, meeting or exceeding the following requirements:

Property	ASTM Designation	Polymer Concrete
Compressive Strength	C39	14,000 psi
Tensile Strength	C78	1,500 psi
Freeze Thaw	C666	1,700 cycles (no weight loss)
Chemical Resistance	C279	Resistant to most acids and alkali
Absorption of Moisture	C140	Less than 0.2 (surface wetting only)

- E. Sealant for Polymer Concrete Trench Drains. Joints between channel sections shall be sealed during installation with a material recommended by manufacturer.

- F. Trench Drain shall have an integrally cast in grade 304 Stainless Steel edge rail to provide strength with a better corrosion resistance.
- G. The outlet of 4" trench drain shall be connected to the inlet of 12" trench drain resulting in a continuous uninterrupted conveyance. Outlet of the 12" trench drain shall be connected to the manhole from a side or bottom knock out to facilitate a continuous and smooth outflow from the trench drain. In-line Catch Basins shall be used wherever possible to make connection to the manhole.
- H. Grate for the trench drain shall be connected to the trench drain resulting in a single homogenous structure. Final elevation of the Trench drain shall match with the grade elevation.
- I. The trench drains provided shall have following particulars.

Name	Internal Width	Min. Slope	Material	Grate Material	Grate Type	Loading
Around the building	4"	0.5%	Polymer Concrete	Stainless Steel	Perforated	ADA Compliant, Load Class A
TD-1, TD-2	12"	0.5%	Polymer Concrete	Ductile Iron	Longitudinal	ADA Compliant, H-25 Loading

2.7 CLEANOUT

- A. Provide cleanouts at all bends on the yard piping wherever specified. Cleanouts shall be made of Extra Heavy Duty Galvanized Cast Iron Pipe, double flanged housing with heavy duty, secured, scoriated cast iron cover with lifting device and an inside caulk outlet that can withstand H25 Loading.
- B. Cleanouts shall be one suitable to use in areas surfaced with concrete or in concrete slabs.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavation and Backfill: Perform excavation and backfill as required.
- B. Precast Items:
 - 1. Place structure on select fill bed or concrete pile cap and set level as shown:

- a. Where pile supports are required, set structure on the pile cap as shown on the Contract Drawings.
 - b. Where pile supports are not required, set on six inches of compacted select fill.
2. Backfill the area that is excavated adjacent to the structure and under the pipe with select fill to prevent settlement and provide for support for the pipe from the manhole edge to the regular trench excavation.
 3. Place backfill in even lifts on all sides to prevent overturning loads.
 4. Set structures at the proper grade and alignment to provide a smooth transition from the incoming pipe(s) to the outgoing pipe.
- C. Connections to Sewers: Provide connections to sewer pipes in accordance with NYCDEP Sewer Design Standards:
1. Manufacture riser sections with openings properly located for making connections to sewers. The minimum distance between a joint in a manhole section and the nearest edge of an opening for a connecting sewer and the diameter of such openings shall be as shown in the NYCDEP Sewer Design Standards.
 2. Provide a connection between the structure and the pipe that is watertight and an invert that is smooth and continuous as it enters and exits the manhole. Sewer pipe shall not protrude into the trough of the manhole.
 3. Join inlet and outlet pipes to the structure with a flexible watertight connection. Seal pipe in the structure openings with a resilient connector meeting the requirements of ASTM C923. Resilient connector shall be cast integrally into the wall of the manhole section at time of manufacture, or, shall be installed by mechanical means in openings cut into manhole wall per ASTM C 923.
- D. Coatings: Precast structures below grade shall be coated with coal tar epoxy applied in two (2) coats, eight (8) mils each.
- E. Laying Masonry:
1. Bricks shall be wetted before applying mortar.
 2. Full bed, end and side joints shall be formed in one operation.
 3. Horizontal joints shall be 3/8 inch maximum and radial joints shall be 1/4 inch maximum.
 4. Keyways shall be completely filled with mortar.
 5. The total amount of adjustment by bricks or concrete rings shall not exceed 12 inches.
- F. Stubs for Future Connections: Where shown, provide stubs or bells cast in walls and provide approved plugs or caps.
- G. Grading:
1. Manholes and catch basins shall be installed such that covers will be at final grade.
 2. Structures shall not project above finished pavements.
 3. Structures in areas with temporary working grades shall be initially installed to match the temporary grade, and adjusted later to final grade prior to regrading.
 4. Contractor shall be responsible for setting structures to the proper grade. The Commissioner's review will be general and will apply to components only.
- H. Trench Drain:

Trench Drains shall be installed according to Manufacturer's recommendations.

3.2 LEAKAGE TESTS

- A. Test the structures for leakage after installation in accordance with Division 2 Section "Leakage Tests."

END OF SECTION 02504

SECTION 02505 - LEAKAGE TESTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Leakage testing for all pipelines and structures required to be watertight or airtight.
- B. Related Sections:
 - 1. Division 2 Section "Installation of Buried Pipelines."
 - 2. Division 15 Section "Interior and Exposed Piping Schedules."

1.2 REFERENCES

- A. ACI 350.1R - Testing Reinforced Concrete Structures for Watertightness.
- B. ASTM C361 - Reinforced Concrete Low-Head Pressure Pipe.
- C. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
- D. New York City Construction Codes
- E. New York City Department of Environmental Protection (NYCDEP), Bureau of Water Supply Standard Water Main Specifications.

1.3 PERFORMANCE REQUIREMENTS

- A. Written Notification of Testing: Provide written notice at least two weeks prior to date of testing.
- B. No tests shall be conducted without an approved written procedure.
- C. All leakage tests shall be conducted in the presence of the Commissioner. The tests shall be repeated in the presence of local authorities having jurisdiction if required by them.
- D. The Contractor shall furnish all labor, equipment, air, water and materials, including meters, gauges, blower, pumps, compressors, fuel, water, bulkheads, temporary weirs, valves, plugs and accessory equipment.

1.4 SUBMITTALS

- A. Testing procedures shall be submitted for approval at least 30 days prior to the test.
- B. Testing Report: Prior to placing the piping system or structure in service, submit for review and approval a detailed bound report summarizing the leakage test data, describing the test procedure and showing the calculations on which the leakage test data is based.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

- A. All pipelines and structures required to be watertight or airtight shall be tested for leakage. Piping and structures which fail the leakage test shall be repaired or replaced to the satisfaction of the Commissioner and retested until leakage test results are acceptable.
- B. Operation of Existing Facilities: Conduct all tests in a manner to minimize as much as possible any interference with the day-to-day operations of existing facilities or other contractors working on the site.
- C. Test gravity sewers and drain lines by an Infiltration Test as specified.
- D. Test air and gas lines with compressed air.
- E. Test water mains with water under the specified pressure and in accordance with NYCDEP Standard Water Main Specifications.
- F. Test all other pipelines with water under the specified pressures.
- G. Test vents and drains in plumbing systems and all cast iron soil pipe lines in accordance with Section C26-1606.0 of the New York City Construction Codes unless otherwise specified. Unless specified otherwise, test all vents and drains on process piping as for plumbing systems.
- H. Leakage in pipelines of other than circular section shall not exceed an amount based on a circular section having an equivalent inner perimeter.

3.2 PRESSURE TESTS OF EXPOSED PIPING

- A. Testing: Pressure test exposed pipelines for leakage by maintaining the fluid in the pipe at the specified pressure for a period of 60 minutes. Examine all accessible joints during the test. Stop all visible leakage and provide repairs as specified in Article 3.6 – Repair of Leaking Pipes.
- B. Test Pressures: Test the various pipelines at the test pressures specified in Division 2 Section “Installation of Buried Pipelines” and Division 15 Section “Interior and Exposed Piping Schedules.”
- C. Backfill: Do not backfill the trench until all visible leaks or other defects have been repaired to the satisfaction of the Commissioner.

3.3 PRESSURE TESTS OF BURIED OR CONCEALED DUCTILE-IRON PIPELINES AND FORCE MAINS

- A. Testing:

1. Completely backfill all harnessed sections of buried piping before such sections are tested. Non-harnessed sections of buried piping shall be tested before backfilling.
 2. Pressure test buried or concealed pipelines for leakage by maintaining the fluid in the pipe at the specified pressure for a minimum period of 4 hours.
 3. Pressure test the piping for leakage as a whole or in sections, valved or bulkheaded at the ends. Apply the specified pressure to the piping through a tap in the pipe by means of a hand pump or other approved method. Do not use air for testing.
 4. Test the piping at the test pressures specified in Division 2 Section "Installation of Buried Pipelines."
- B. Allowable Leakage: Stop all visible leakage. Do not allow leakage for any piping, as determined by the above test, to exceed the allowable leakage for ductile iron water mains as given by the following formula in Section 4 of AWWA C600 in which L is the allowable leakage in gallons per hour, S is the length of water main tested in feet, D is the nominal diameter of the pipe in inches and P is the average test pressure in psi gauge:

$$L = \frac{S \times D \times (P)^{1/2}}{148,000}$$

3.4 VALVE TESTING

- A. Testing: Operate valves in the section under test through several complete cycles of closing and opening. In addition, have the test pressure for each valve, when in the closed position, applied to one side of the valve only. Test each end of the valve in this manner.
- B. Test Pressure: Test each valve at the same test pressure as that specified for the pipe in which the valve is installed.
- C. Leakage: Stop all external and internal leakage through the valves.
- D. Movement: Stop all valve movement or structural distress.

3.5 LEAKAGE TESTS FOR GRAVITY SEWERS

- A. Submerged Testing Procedure: When the groundwater level is above the sewer, test sewers for infiltration as follows:
 1. Measure the infiltrated flow of water by means of a weir set up in the invert of the sewer at a known distance from a temporary bulkhead or other limiting point of infiltration.
 2. Test after the sewer or sewers have been pumped out, if necessary.
 3. Do not start testing until normal infiltration conditions are established in the work to be tested.
 - a. Inspect gravity sewer visually for infiltration.
 - b. Pump the sewers dry and make sure the groundwater level is above the crown of the sewer.
 - c. Inspect the sewer on the inside and seal all visible leaks completely.

- B. Non-Submerged Testing Procedure: If the groundwater level is below the top of the sewer, test for leakage as follows:
 - 1. Construct a bulkhead in the sewer at the manhole at the lower end of the section under test.
 - 2. Fill the section being tested with water until the level of water is four feet above the crown of the sewer in the manhole at the upper end of the test section. For concrete sewers, allow the water to remain in the piping for at least 12 hours before conducting the tests.
 - 3. Leakage will be the measured amount of water added to maintain the water at that level.
- C. Carry on tests for a minimum of eight hours with readings at 60 minute intervals.
- D. In computing the length of sewer contributing infiltration or leakage, include the length of house connections tested, if any, in the total length.
- E. The quantity of infiltration or leakage for sewers shall not exceed 200 gallons per inch of diameter per mile per 24 hours for sewers up to and including 24 inches in diameter, and shall not exceed 5,000 gallons per mile per 24 hours for all sizes larger than 24 inches in diameter.

3.6. REPAIR OF PIPING LEAKS

- A. Repair leaks as follows:
 - 1. Replace broken pipe or joint assemblies found to leak. Regardless of the amount of infiltration or leakage measured, repair and seal all visible or detectable leaks in the piping, sewers, manholes, structures, and other appurtenances.
 - 2. When leakage occurs in excess of the specified amount, locate and repair defective manholes, valves, pipe, cleanouts or joints.
 - 3. If defective portions cannot be located, remove and reconstruct as much of the original work as necessary to obtain piping that meets the leakage or infiltration requirements specified herein and retest, all at no addition to the Contract Price.

3.7. LEAKAGE TESTS FOR CONCRETE STRUCTURES

- A. Leakage tests of wet wells, tanks, channels, containment areas, and other water retaining structures shall be performed following the requirements of ACI 350.1R and as specified herein. The Contractor shall supply all materials and labor needed to conduct the test as directed by the Commissioner.
- B. Prior to start of leakage testing, the following requirements shall be met.
 - 1. All elements of the structure which resist any portion of the retained liquid pressure shall be in place and at specified strength levels. All concrete shall be fully cured.
 - 2. Structure walls shall not be backfilled prior to leakage testing.
 - 3. All valves, gates, blind flanges, and other non-concrete items which control the flow or otherwise retain the liquid contents of the structure, shall be checked for watertightness. If not watertight, means shall be taken to assure watertightness during the period of the leakage test.

4. The portions of the structure to be tested shall be cleaned of all construction debris, standing water, soil, foreign materials and any other material which interferes with the exposed concrete surfaces of the structure.
5. Defective concrete shall be repaired.
6. The Contractor shall notify the Commissioner a minimum of 24 hours prior to start of filling of structure for leakage testing. Leakage testing shall not start until the structure is inspected by the Commissioner.

C. Filling the Structure with Water:

1. The portion of the structure to be tested shall be filled at a rate not to exceed two feet per hour.
2. The structure shall be filled to the normal operating depth of the structure as indicated on the Contract Drawings. Where no operating depth is indicated or where operating depth is controlled by flowing over a weir, the structure shall be filled to a depth 6 inches below the weir or top of wall elevation, whichever is lower.
3. Water in the structure shall be maintained at the specified test elevation for a minimum of three days prior to the start of the leakage test.

D. After water has been brought to the test elevation, the exposed elements of the structure shall be inspected for leakage. All locations which exhibit any amount of leakage flow shall be repaired prior to the start of leakage testing.

E. The leakage test duration shall be determined by the Commissioner based on ACI 350.1R but shall not be less than 3 days.

F. Leakage Allowance:

1. For unlined concrete structures, the maximum allowable leakage rate shall be 0.075 percent of the volume per 24-hour period.
2. For concrete structures with walls lined by a waterproof material, the maximum allowable leakage rate shall be 0.050 percent of the volume per 24 hour period.

G. Test Locations:

1. Structure cells which are less than 1000 square feet in area shall have measurements of water level taken at two locations which are located approximately 180 degrees apart.
2. Structure cells which are greater than 1000 square feet in area shall have measurements of water level taken at four locations which are located approximately 90 degrees apart.
3. Each test location shall be marked and given a reference number. A reference point shall be marked on the face of the wall above the test water surface in a manner which will prevent its movement or deterioration during the period of the test.
4. Test locations must be approved by the Commissioner.

H. Evaporation and Precipitation Measuring:

1. In open structures, a clear plastic calibrated open-top container not less than 18 inches in diameter and depth shall be partially filled, floated in the tank, and held in position near each measurement location.

2. The container shall be located so as not to be shaded by tank walls and away from any items passing over it such as beams or pipes.

I. Test Measurements:

1. Leakage tests shall not be started when periods of severe weather conditions or major changes in average daily temperature are predicted.
2. The following measurements shall be recorded at each test location at the start of the test period and at 24-hour intervals thereafter:
 - a. Distance from reference point to test water surface
 - b. Depth of water in the floating container
 - c. Temperature of the test water at 18 inches below water surface
 - d. Temperature of the water in the evaporation-precipitation container at mid-depth
 - e. Leakage Determination:
3. The change in water surface elevation at each test location shall be averaged and adjusted as follows.
4. The total change in test water surface elevation shall be adjusted by the average change in water surface elevation in the evaporation-precipitation containers.
5. Where averaged water temperature measurements vary by more than 3 degrees from start to completion of the test period, adjustment in tank volume shall be determined by change of water density resulting from the change in the average water temperature.

J. Retesting:

1. The leakage test shall be considered as failed if the specified leakage allowance is exceeded or if any leakage is observed.
2. If the test becomes unreliable due to excessive precipitation or other external factors, it shall be restarted.
3. If a leakage test fails, it may be retested immediately without repairs if approved by the Commissioner. If subsequent leakage tests fail, the Contractor shall repair all probable areas of leakage and the leakage test shall be repeated. The structure shall be retested until it meets the specified leakage criteria. Repairs shall be made to the probable leakage areas before each retest.

3.8 LEAKAGE TESTS FOR NON-CONCRETE STRUCTURES

- A. Steel, poly and fiberglass-reinforced plastic tanks and similar structures shall be tested for leakage by bulkheading the openings and filling the structure with water to 6 inches below the overflow water level. The tank shall be kept full until the water temperature has stabilized, but not less than 24 hours before the start of the leakage test. The leakage test shall consist of measuring the water surface elevation from a fixed point on the tank at two locations 180 degrees apart. Measurements shall be taken at the start of the test and 24 hours later.
- B. Testing shall be performed before the installation of mechanical equipment and before applying any waterproofing coatings to the outside surfaces.

- C. The exterior surface of the structure shall be inspected for leakage, especially in areas around joints.
- D. Where environmental conditions could lead to changes in water level due to evaporation or precipitation, measurement of these factors shall be made as specified for testing concrete structures.
- E. The leakage test shall be considered failed if there is any measurable drop in the water surface (after adjusting for evaporation and precipitation) during the 24-hour test period or if there is any visible leakage.
- F. If visible leaks appear or if leakage exceeds the allowable limit, the structure shall be repaired by removing and replacing the leaking portions of the structure, waterproofing the inside, or by other approved methods. After repairs are complete, the test shall be repeated.

END OF SECTION 02505

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SECTION 02745 – CAST LAMINATED GLASS PAVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide cast laminated glass pavers in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:
 - 1. Custom cast laminated tempered glass pavers.
 - 2. Packing, reinforcing, anchors, grout, sealants and other installation accessories.
- B. Related Sections:
 - 1. Division 2, Section "Concrete Curbs, Headers and Sidewalks."
 - 2. Division 2, Section "Exterior Plants"

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification:
 - 1. Full-size units of each type of glass paver, grout, anchors, sealants and other accessories.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of glass paver, joint material, and setting material from single source with resources to provide materials and products of consistent quality in appearance and physical properties.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store glass pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 4.4 deg C.
 2. When joint substrates are wet or covered with frost.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Engineering design of cast laminated glass paving by Contractor.
1. Uniform load of 150 lbf/sq. ft. or concentrated load of 3000 lbf. for normal conditions.
 2. Uniform load of 250 lbf.sq. ft. or concentrated load of 8000 lbf. for vehicle loads.

2.2 CAST LAMINATED TEMPERED GLASS PAVERS

- A. Pre-Approved Manufacturers: Subject to compliance with requirements, provide cast laminated tempered glass pavers as specified herein, and by one of the following pre-approved manufacturers or an equal approved by the Commissioner:
1. Jaroff Design.
 2. Dep Glass.
 3. Schott North America.
- B. Laminated Tempered Glass: ASTM C 1036, ASTM C 1172. Two planks of double-strength, clear glass; Type I, Class 1, quality q3; permanently laminated together with minimum 0.030" thick sheet of plasticized polyvinyl butyral, which has been produced specifically for laminating glass.
1. Kind: LT (laminated tempered), unless otherwise indicated.
 2. Clear Glass: Class 1 (clear).
 3. Thickness: As indicated; but not less than required by structural loads.
- C. Custom Cast Laminated Glass Pavers: Provide transparent laminated, tempered cast glass planks with heavily textured top surfaces made by fusing together two solid slabs of clear, colorless glass with manufacturer's standard clear-colored translucent, polyvinyl-butyral-based coating factory applied on edge surfaces complying with the following requirements for pattern, size, and other characteristics:

1. Edge Coating: Provide manufacturer's standard edge coating, unless otherwise indicated.
2. Sizes: As indicated or selected by the Commissioner.

D. Coating: Silver coat with protective coats as required for compliance with Federal Specification DD-M-00411D, min. 150 hours of 20% salt spray application.

2.3 ACCESSORY MATERIALS

- A. Expansion Strips: Provide manufacturer's recommended expansion strips. Use where shown or required.
- B. Asphalt Emulsion: Water base asphalt emulsion of type recommended by glass plank unit manufacturer.
- C. Packing: Polyethylene foam or equal filler compatible with sealant material specified under Division 7 Section "Joint Sealants". Use packing where recommended by the manufacturer.
- D. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length required.
- E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times load imposed when installed in unit masonry and equal to 4 times load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing laboratory.
 1. Material: Group 1 alloy 304 or 316 stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594.

2.4 GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I. Provide color-pigmented cement, factory packaged standard product of white cement combined with color fast mineral pigments to produce color indicated, or if not indicated as selected by the Commissioner.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Grout: ASTM C 144, clean, white, quartzite type, unless otherwise recommended by the manufacturer.
- D. Water: Clean and potable.

2.5 GROUT MIXES

- A. General: Do not lower the freezing point of grout by using admixtures or antifreeze agents. Do not use calcium chloride.

- B. Grout for Glass Planks: Comply with ASTM C 270, proportion specification for Type S portland cement-lime grout. Do not use masonry cement.
 - 1. Include waterproofing admixture in grout mix according to directions of admixture manufacturer.
 - 2. For pointing grout, include waterproofing admixture in grout mix according to directions of admixture manufacturer.
 - 3. Colored Pigmented Grout: Select and proportion pigments with other ingredients to produce grout color selected by the Commissioner. Do not exceed pigment-to-cement ratio of 1-to-10 by weight.
- C. Mix grout to produce a stiff but workable consistency in accordance with the manufacturer's recommendations and printed instructions. Do not re-temper grout after it has taken its initial set.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Condition of Surfaces to Receive Glass Paving: Inspect substrates to assure surfaces to support glass pavers are as follows:
 - 1. To proper grade and elevation.
 - 2. Free of dirt and other deleterious materials.
- B. Report any unsatisfactory conditions to Commissioner in writing. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Verify conditions of openings to receive glass pavers, channels and anchors to steel support framing.
- B. Mix grout ingredients to comply with manufacturer requirements. Grout shall be a stiff consistency, drier than that used for ordinary masonry, unless otherwise recommended by the manufacturer.
 - 1. Do not use antifreeze compounds or accelerators.
- C. Panel Reinforcing and Anchors: Remove dirt and other foreign matter prior to glass paver installation.

3.3 ALLOWABLE TOLERANCES IN GLASS PAVING WORK

A. General: Set glass paver to comply with the following construction tolerances:

1. Variation from Level: For grades indicated for bed joints, and other conspicuous lines, do not exceed 1/4 inch in 15 feet.
2. Variation in Grout Joint Dimension: For joints do not exceed plus or minus 1/16 inch.

3.4 INSTALLATION

A. General:

1. Do not install cracked, broken or chipped glass paver units.
2. Lay glass units plumb, level and accurately spaced.
3. Adjust glass paver units to final position when grout is soft and plastic.
4. If units are displaced after grout has stiffened, remove, clean joints and units of grout and relay with fresh grout.
5. When joining fresh glass paver units to set or partially set construction, clean exposed surface of set units and remove loose grout prior to laying fresh glass plank units.
 - a. Anchors: Install as indicated on the approved Shop Drawings. Anchors shall fabricated and installed in strict compliance with the Commissioner's requirements.

3.5 CLEAN-UP

- A. General: Comply with glass paver manufacturer's recommendations for cleaning.
- B. Remove surplus grout, excess glazing compounds, and sealants and wipe faces of glass pavers dry as work progresses.
- C. Do not use abrasive cleaners, steel wool or wire brushes in conjunction with removing dirt or grout from glass plank faces.
- D. Provide final cleaning by washing with clean water, then wipe dry with a clean dry soft cloth on both glazing surfaces.

END OF SECTION 02745

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SECTION 02762 - TRAFFIC PAINT PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies requirements for the installation of new painted pavement markings and the removal of any related or conflicting pavement markings. The Contractor shall furnish and apply pavement marking paints, including glass beads thereto, at the locations and in accordance with patterns indicated on the Contract Drawings or as instructed by the Commissioner, and in conformance with these Specifications.

1.2 REFERENCES

- A. The following is a listing of the publications and specifications referenced in this Section:
1. Federal Highway Administration (FHWA):
 - a. Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) [Recent Edition].
 2. American Society for Testing and Materials (ASTM):
 - a. ASTM D 1155 Test Method for Roundness of Glass Spheres.
 - b. ASTM D 1213 Test Method for Crushing Resistance of Glass Spheres.
 - c. ASTM D 1214 Test Method for Sieve Analysis of Glass Spheres.
 - d. ASTM D 1535 Method for Specifying Color by the Munsell System.
 3. Federal Specification - (Reference specification for testing procedures only. See Part 2 of this Section for complete specification requirements.)
 4. TT-P-85e, September 15, 1977.
 5. Federal Test Method Standard 141b, dated February 1, 1979 (or more recent) Paint, Vanish, Lacquer, and related materials.
 6. Current ASTM tests.

1.3 QUALITY ASSURANCE

- A. Warranty: The pavement markings shall be warranted by the Contractor against abrasion, bleeding, blistering, chipping, cracking, fading, flaking, loss of adhesion, peeling, softening, or other deterioration for a period of 1 year from the date of installation.
- B. Tolerances:
1. Width of Lines: Minus zero, plus 1/8 inch.
 2. Length of skip or lane lines and unpainted surface between the skip lines shall be plus or minus 3 inches.
 3. Location of Directional Arrows, Messages, and Stripes within 2 inches of locations shown on the Contract Drawings.
 4. Size of Letters and Arrows: plus or minus 2 inches.

1.4 SUBMITTALS

- A. Submit detailed catalog cuts, manufacturer's specifications and test data of products proposed for use demonstrating conformance to the requirements of this Section.
- B. A schedule of pavement marking to be performed.
- C. Submit proposed means of cleaning, removing, or obliterating existing or unsatisfactory markings to the Commissioner for approval prior to commencing corrective work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Formulation and Manufacturing: The paint shall be formulated and manufactured from first-grade raw materials and shall be free from defects and imperfections that might adversely affect the serviceability of the finished product. The materials shall show no hard settling or gelling upon storage in the sealed containers as received that will affect the performance of the product. The paint shall be furnished ready for use. No additional thinner shall be added. Total volatile organic substances (VOC's) in the paint shall not exceed 2.08 lbs/gal. (250 grams/liter). The paint shall contain less than 0.06% lead or chromium in final composition.
- B. Directional Reflectance - The daylight directional reflectance of the white paint (without glass spheres) shall not be less than 84% and not less than 54% for yellow (relative to magnesium oxide), when tested in accordance with ASTM E-97. Furthermore, the yellow shall substantially match the "Light Limit V +" chip on the Highway Yellow Color Tolerance Chart (PR Color #1, June 1965). Yellow shall conform to the Federal Standard 595a No. 33538.
- C. Flexibility - The paint shall show no cracking or flaking when tested in accordance with Federal Specification TT-P-85e, Section 3.4.6.
- D. Bleeding - The paint shall have a minimum bleeding ratio of 0.94 when tested in accordance with Federal Specification TT-P-85e, Section 4.4.8. The asphalt saturated felt shall conform to Federal Specification HH-R-590.
- E. Weight/Gallon - The paint shall have a minimum weight per gallon of 14.5 yellow; 15.1 white.
- F. Viscosity - The consistency of the paint shall be not less than 75 or more than 100 Krebs Units at 25 C, when tested in accordance with ASTM D-562.
- G. Dry Opacity - ASTM D-2805. The film shall be applied with a 0.005 inch Bird Applicator. The minimum Contract Ratio of the white and yellow paint shall be 0.96.
- H. Water Resistance - The paint shall conform to Federal Specification TT-P-85e, Section 3.4.7. There shall be no blistering or appreciable loss of adhesion, softening or other deterioration after examination.
- I. Field Drying Time - The paint, when applied at 11 mils +/- 1 mil wet film thickness and 160 F at the gun and with a glass spheres at the rate of six pounds per gallon of paint, shall dry to no pickup under 1 minute when tested by simulated passing with a passenger car. A line showing

no visual deposition of the paint to the pavement surface when viewed from a distance of fifty feet shall be considered non-tracking and conforming to the requirement of the field drying time.

- J. Lab No. Pickup - The paint when tested by Federal Specification TT-P-85e, Section 4.4.6 shall not be greater than 30 min.
- K. Fineness of Grind - The paint shall have a minimum fineness of grind of 3 Hegman.
- L. Total Non-Volatile - The paint shall have a total non-volatile content of not less than 85% by weight.
- M. Abrasion Resistance - No less than 35 Liters of sand shall be required for removal of the baked paint film. The abrasion resistance test shall be in accordance with TT-P-85e, Section 3.5.2.1 (10 Liters per mil of dried paint)
- N. Shelf Life - The paint shall have a usable shelf life of not less than 6 months. The paint shall have no hard settling, caking or separation. The paint shall be able to be mixed easily by means of mechanical stirrer. Paint is to be stored in inside structures at normal room temperature.
- O. The paint shall be lead- and chromium-free (less than .06%).
- P. The dried paint shall match Federal Color Standards -- White 595a and Yellow 33538.
- Q. Appropriate cleaning solvents are to be prescribed. These solvents are to be environmentally safe per NY & NJ Regulations.
- R. Material Safety Data Sheets (MSDS) are to be part of every shipment and test sample of paint and cleaning solvent.
- S. The beads for reflectorizing the paint shall be glass of a composition designed to be highly resistant to traffic wear and to the effects of weathering. The beads shall be colorless, clean, transparent, free from milkiness or excessive air bubbles, and essentially free from surface scarring or scratching. They shall be spherical in shape and at least 70% of the glass beads shall be true spheres.
 - 1. The silica content of the glass beads shall not be less than 60%.
 - 2. The beads shall have a refractive index between 1.50 and 1.65 when tested by the liquid immersion method at 25 degrees Celsius.
 - 3. The spheres shall meet the following gradation:

<u>U.S. Standard Sieve</u>	<u>Min.</u>	<u>Max. Passing</u>
No. 20; Retained No. 30	5%	20% Passing
No. 30; Retained No. 50	30%	75% Passing
No. 50; Retained No. 80	9%	32% Passing
No. 80	0%	10%

- 4. The beads shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely and to the satisfaction of the

- Commissioner from the dispensing equipment at any time when surface and atmospheric conditions are satisfactory for painting.
5. The glass beads shall be packed in waterproof, plastic lined burlap, or plastic lined paper bags. Each bag shall be marked with the name and address of the manufacturer and the name and net weight of the material.
- T. Testing of Glass Beads - The properties indicated above shall be determined in accordance with the following methods of test:
1. Sphericity: Irregularly shaped particles (out-of-round) shall be tested in accordance with ASTM D1155
 2. Gradation: Tested in accordance with ASTM D1214.
 3. Moisture Resistance: The spheres shall pass the following moisture resistance test:
 - a. Place two pounds of spheres in a washed cotton bag, having a thread count of 50 per square inch (warp and woof) and immerse the bag in a container of water for 30 seconds. Remove the bag and force excess water from the sample by squeezing the bag. Suspend and allow to drain for two hours at room temperature (70-72 F). Then, mix the sample in the bag by shaking thoroughly. Transfer sample slowly to a clean, dry glass funnel having a stem 4" in length, with 3/8" inside diameter stem entrance opening and a minimum exit opening of 1/4". The entire sample shall flow freely through the funnel without stoppage. When first introduced into the funnel, if the spheres clog, it is permissible to lightly tap the funnel to initiate the flow.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. All final, interim, and temporary pavement markings and patterns shall be placed as shown on the Contract Drawings and in accordance with the Federal MUTCD.
2. Before any final pavement marking work is begun, a schedule of operations shall be submitted to the Commissioner for approval. A schedule for temporary markings and patterns for detours and other temporary traffic controls shall also be submitted to the Commissioner for approval prior to placement. At least 48 hours advance notice must be given to the Commissioner before performing any pavement marking work.
3. When pavement markings are applied under traffic, the Contractor shall provide all necessary flaggers, signs, and other traffic control devices to maintain and control traffic, and to protect the marking operation and the new markings until thoroughly dry. The application of pavement markings shall be done in the general direction of traffic; striping against traffic shall not be allowed. Short duration lane and work area closures shall be in accordance with the requirements of the General Conditions.
4. The Contractor shall be responsible for cleaning the pavement to the satisfaction of the Commissioner, of dust, dirt and other foreign material which may be detrimental to the adhesion of the paint film.
5. Detour and other temporary or conflicting markings shall be removed as soon as practicable as directed by and to the satisfaction of the Commissioner. If darkness or

inclement weather interferes with the removal operations, such operations shall be accomplished during the next daylight period or as soon thereafter as weather permits.

6. The method of removal is subject to the approval of the Commissioner. Painting out pavement markings is generally not permitted, and if approved will only be permitted for very short term use. Grinding, scraping, sandblasting, etc. must be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that will mislead or misdirect the motorist.
7. When necessary, the Contractor shall establish marking line points at 30 foot intervals throughout the length of the pavement, or as directed by the Commissioner.
8. The paint shall be applied in strict accordance with the manufacturer's recommendations for use. Further, at the time of application pavement surfaces shall be thoroughly dry.

B. Application of Pavement Markings:

1. Except as noted herein, painted pavement markings shall be applied with atomizing spray type striping machines. The striping equipment may be either truck-mounted or hand-operated. All equipment shall be compatible with and suitable for the application of the type of paint being used.
2. Applied markings shall have clean-cut edges, true and smooth alignment and a minimum uniform wet film thickness of 15 mils. Glass beads shall be applied uniformly over and into the wet paint film at the rate of 6 lbs per gallon of paint. Glass bead dispensers shall be of a type that will mechanically and automatically give such performance.
3. Upon approval by the Commissioner, paint rollers or brushes may be used for marking cross-hatched and solid painted gore areas, letters, symbols, stop bars, short temporary detours or other such areas as directed by the Commissioner. When rollers and brushes are allowed, glass beads shall be applied to the wet paint film at the specified rate and in a manner suitable to the Commissioner.
4. The Contractor shall repaint or remove and reapply any pavement markings that fail to satisfy the requirements specified in this Section at no cost to the City of New York.
5. The Contractor shall continuously monitor, maintain, and repair all installed pavement markings until completion of the Contract.

END OF SECTION 02762

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SECTION 02771 - CONCRETE CURBS, HEADERS AND SIDEWALKS

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall provide all labor, materials, and equipment required to provide concrete curbs, headers, and sidewalks, as shown, specified and required.

1.2 REFERENCES

- A. ASTM A36 - Carbon Structural Steel.
- B. Latest Edition of New York City Department of Transportation (NYCDOT), Bureau of Highway Operations Standard Specifications.

1.3 DESIGN REQUIREMENTS

- A. Concrete curbs, headers, and sidewalks which are outside the building line of the site and under jurisdiction of other City agencies, even though constructed as part of this Contract, shall be constructed in accordance with the Rules and Regulations, Standard Details and Standard Specifications of the governing agency in effect at the time of the award of this Contract and as further defined in the Contract Drawings and these specifications.
- B. All concrete used in constructing curbs, headers, and sidewalks shall be Class 30 in accordance with Division 3 Section "Cast-In-Place Structural Concrete."

1.4 SUBMITTALS

- A. The Contractor shall furnish all working drawings and material specifications for the approval of the Commissioner in accordance with the requirements of Division 1. Submittals shall include, but not be limited to those required in Division 3 Section "Cast-In-Place Structural Concrete."
- B. The Contractor shall submit marked-up drawings and shop drawings including shop and field test reports of concrete samples tested in an approved laboratory.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Coarse aggregate, unless otherwise specified, shall conform to the requirements of Division 3 Section "Cast-In-Place Structural Concrete."
- B. Concrete shall be air-entrained in accordance with Division 3 Section "Cast-In-Place Structural Concrete."
- C. Material for foundation of curbs, headers, and sidewalks shall consist of clean cinders complying with the requirements of Section 4.13 of NYC Department of Transportation

Standard Specifications, or Size No. 3 broken stone or gravel complying with the requirements of Section 2.02, NYC Department of Transportation Standard Specifications, 100 percent of which passes a 2-1/2-inch square sieve; or other approved broken concrete, 100 percent of which passes a 2-1/2-inch square sieve; or other approved granular material containing not more than 5 percent material passing a No. 200 mesh sieve and not more than 5 percent retained on a 2-inch square sieve.

- D. Prefomed expansion joint filler shall be Type IV as described in Section 2.15 of the Standard Specifications of the New York City Department of Transportation, Bureau of Highway Operations.
- E. Joint sealing compound for horizontal joints shall be asphaltic blown joint filler as described in Section 2.16 of the Standard Specifications of the New York City Department of Transportation.
- F. Structural steel shall be ASTM A36.

2.2 SOURCE QUALITY CONTROL

- A. Concrete shall be tested and evaluated for strength and acceptance in accordance with the requirements of Division 3 Section "Cast-In-Place Structural Concrete."

PART 3 - EXECUTION

3.1 SIDEWALK INSTALLATION

- A. Concrete sidewalk shall be of the width shown or otherwise specified and shall be laid on 6 inches thick compacted broken stone base, as specified or shown on the Contract Drawings.
- B. Sidewalk shall consist of a single course of concrete 4 inches thick except at driveway and quadrant corner where the thickness is 7 inches.
- C. All existing material within the required 6 inches of foundation shall be removed in its entirety. Additional depth of foundation material for special conditions shall be placed as required by the Commissioner.
- D. Materials: Foundation material shall be placed on the prepared subgrade and thoroughly compacted into a course not less than 6 inches thick. The top surface shall be parallel to the finished grade and at a distance below the grade equal to the specified thickness of concrete.
- E. Forms: Forms shall be in accordance with Division 3 Section "Cast-In-Place Structural Concrete."
- F. Slabs: Concrete sidewalk shall be built in approximately 20-foot lengths between expansion joints. The sidewalk shall be separated from adjoining structures by expansion joints. When directed, these joints shall be filled with dry sand. Expansion joints in sidewalk shall coincide with expansion joints in curb. Tooled control joints not less than 1/2 inch in depth shall be provided where at four foot intervals unless otherwise shown on the Contract Drawings.

- G. Expansion Joints: Transverse expansion joints shall be 1/2 inch in width and shall be filled with preformed joint filler to within 1 inch of the sidewalk surface. The top one inch shall be sealed with asphaltic blown joint filler complying with the requirements of Section 2.16 of the New York City Department of Transportation Standard Specifications.
- H. The foundation material shall be wetted immediately before concrete is placed. The concrete shall be placed within the forms and thoroughly tamped until the surface is at the finished grade.
- I. Each rectangular slab shall have all edges neatly rounded with proper tools and be bounded on all sides by a troweled border about 1 inch in width.
- J. Backfilling shall follow the removal of forms as soon as practicable and, unless otherwise permitted, shall be of clean earth, satisfactorily compacted.
- K. Concrete sidewalk shall be cured according to Division 3 Section "Cast-In-Place Structural Concrete."

3.2 CURB AND HEADER INSTALLATION

- A. Concrete curbs, headers, and steel faced concrete curbs, except as otherwise detailed and specified, shall be constructed in accordance with the applicable provisions of Sections 4.07, 4.08 and 4.09, Standard Specifications of the New York City Department of Transportation, Bureau of Highway Operations, except that concrete strength shall conform to Class 30 as indicated in Division 3 Section "Cast-In-Place Structural Concrete." Depressed curbs shall be provided where specified or shown on the Contract Drawings.
- B. Steel street curbs shall conform to ASTM A36 of the size indicated on the Contract Drawings. The length of straight runs shall be not less than 10 feet nor more than 20 feet. Curved curb angles shall be bent to the radius indicated, and provided with a straight tangent at each end, 3 feet in length. Special steel curb angles of approved type shall be provided at drop curbs. Where the length of the special drop curb exceeds 20 feet, it shall be spliced with an approved type butt welded joint. Anchors shall be welded to all steel curbing. The steel curbs shall be placed within the forms, upon suitable chairs, to the proper lines and grades. The joints between units of curbing shall be 1/8 inch. All surfaces of steel curbing, including anchors, shall be thoroughly cleaned of all rust, oil, grease, scale or other foreign matter before concrete is placed. All surfaces of steel curbing which are to remain exposed in the finished work shall be painted in the shop in accordance with Division 9 Section "High Performance Coating." Finish coats shall be gray in color.
- C. Granite and bluestone street curbs and headers shall be Class A dressed curbs and headers conforming to the requirements of Section 2.12 of the City of New York Department of Transportation, Bureau of Highway Operations Standard Specifications. When specified, a concrete cradle shall be used conforming to the provisions of Section 4.07 of the Standard Specifications of the Department of Transportation, Bureau of Highway Operations, except that concrete strength shall conform to Class 30 as indicated in Division 3 Section "Cast-In-Place Structural Concrete."
- D. The Detectable surface warning to be used in the quadrants shall be in accordance with section 4.13DE of Standard Specifications of the New York City Department of Transportation constructed in accordance with 4.13DE.3.

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SECTION 02780 - UNIT PAVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide unit pavers in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Interlocking rubber plaza deck paver, full sized in each color and texture required.

- B. Related Sections:

1. Division 3, Section "Cast-in-Place Structural Concrete" for concrete parapet walls.
2. Division 3, Section "Precast Concrete Hollow Core Planks" for roof deck.
3. Division 7, Section "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for roofing membrane.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Samples for Verification:

1. Full-size units of each type of unit paver and pedestal assembly indicated.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- C. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

PART 2 - PRODUCTS

- A. Rubber Roof Pavers: Interlocking, lightweight rubber units, 24 by 24 by 2-1/4, 6 lb/sq.-ft. specially manufactured for use as roof ballast; with grooved back for 4-way drainage, beveled and doweled; and as follows:
 - 1. Perimeter Securement Strip: Manufacturers standard sheet channel or hold down, and fasteners; as required.
 - 2. Color: Two color pattern, as indicated on the Drawings.
- B. Selected Products: Provide "Interlocking Rubber Pavers", as manufactured by Carlisle SynTec Incorporated, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 RUBBER PAVER INSTALLATION

- A. Roof Pavers: Install interlocking roof pavers according to manufacturer's written instructions in locations indicated, to form walking surfaces over roof membranes.

END OF SECTION 02780

SECTION 02826 – DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Provide decorative metal fences and gates in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Custom decorative aluminum fences with cantilever gates.
2. Custom pickets.
3. Custom stainless steel gate frames.
4. Gate operators, including controls.

B. Related Sections:

1. Division 3, Section "Cast-in-Place Structural Concrete" for concrete and post concrete fill.

1.2 PERFORMANCE REQUIREMENTS

A. Lightning-Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For gates. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Samples: For each fence material and for each color and finish specified.

1. Provide Samples 12 inches in length for linear materials.
2. Provide Samples 12 inches square for tube, sheet or plate materials.

D. Welding certificates.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for decorative metallic-coated steel tubular picket fences, including finish, indicating compliance with referenced standard and other specified requirements.

F. Maintenance Data: For gate operators to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. 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.
- D. UL Standard: Provide gate operators that comply with UL 325.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Include Extent of length of mock up of fence is shown on the Drawings and if not shown to the extent required by the Commissioner.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- F. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 ALUMINUM

- A. Aluminum, General: Provide alloys and tempers with not less than the strength and durability properties of alloy and temper designated in paragraphs below for each aluminum form required.
- B. Extrusions: ASTM B 221, Alloy 6063-T5.
- C. Tubing: ASTM B 429/B 429M, Alloy 6063-T6.
- D. Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- E. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.
- F. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

2.2 STEEL AND IRON

- A. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Tubing: ASTM A 500, cold formed steel tubing.
- C. Castings: Either gray or malleable iron unless otherwise indicated.
 - 1. Gray Iron: ASTM A 48/A 48M, Class 30.
 - 2. Malleable Iron: ASTM A 47/A 47M.

2.3 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 316.
- B. Pipe: ASTM A 312/A 312M, Grade TP 316.
- C. Castings: ASTM A 743/A 743M, Grade CF 8M or CF 3M.
- D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316.
- E. Bars and Shapes: ASTM A 276, Type 316.

2.4 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153 for steel and iron hardware and with ASTM A 123 for other steel and iron products.
- B. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with the following requirements:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick or thicker.
 - 3. Galvanize all exterior steel unless otherwise noted.
- C. Preparation for Shop Priming: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
 - 2. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
- E. High Performance Paint System:
 - 1. Primer: Zinc Rich Coating; equal to Tnemec 90-97; applied to a DRT of 2.5 to 3.5 mils.
 - 2. Intermediate Coat: Polyamide Epoxy; equal to Tnemec Series 27; applied to a DFT of 4 to 5 mils.
 - 3. Shop Finish: Polyfunctional Hybrid Urethane; equal to Tnemec Series 750; applied to a DRT of 2 to 3 mils.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for strength and compatibility in fabricated items.
- B. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107 and specifically recommended by manufacturer for exterior applications.

2.6 GROUNDING MATERIALS

- A. Grounding Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
1. Material above Finished Grade: Copper.
 2. Material on or below Finished Grade: Copper.
 3. Bonding Jumpers: Braided copper tape, 1 inch wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.
- B. Grounding Connectors and Grounding Rods: Comply with UL 467.
1. Connectors for Below-Grade Use: Exothermic-welded type.
 2. Grounding Rods: Copper-clad steel.
 - a. Size: 5/8 by 96 inches.

2.7 DECORATIVE ALUMINUM FENCES

- A. Decorative Aluminum Fences: Fences made from aluminum extrusions.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ameristar Fence Products.
 - b. Master Halco.
 - c. Merchants Metals.
 - d. Royal Aluminum and Steel, Inc.
 - e. Superior Aluminum Products, Inc.
 - f. Tek-Rail.
 - g. Ultra Aluminum Mfg., Inc.
 - h. Or equal.
- B. Posts: Square extruded tubes.
1. Posts: Size as shown, with minimum 0.080-inch wall thickness.
 2. Horizontal-Slide Gate Post: Size as shown with minimum 0.125-inch wall thickness.
- C. Rails: Extruded-aluminum channels, Size as shown, with minimum 0.082-inch- thick sidewalls and 0.055-inch- thick top.
- D. Pickets: Extruded-aluminum bar stock: Size as shown.
1. Picket Spacing: As shown.

- E. Fasteners: Manufacturer's standard concealed fastening system.
- F. Fasteners: Manufacturer's standard tamperproof, corrosion-resistant, color-coated fasteners matching fence components with resilient polymer washers.
- G. Fabrication: Assemble fences into sections by welding pickets to rails.
 - 1. Fabricate sections with clips welded to rails for field fastening to posts.
 - 2. Drill clips for fasteners before finishing.
- H. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.
- I. Finish: Epoxy exterior enamel or epoxy exterior powder coating.

2.8 CANTILEVERED GATE

- A. Basis-of-Design Products: Subject to compliance with requirements, provide high performance cantilevered gate hardware, carriages, tracks, and accessories formed or manufactured from stainless steel type 316, corresponding with model "CGS 350.8G" as manufactured by DuraGates/Comunello, or an equal approved by the Commissioner.
 - 1. Gate Configuration: As indicated.
 - 2. Gate Frame Height: As indicated.
 - 3. Gate Opening Width: As indicated.
 - 4. Gate Construction: Welded steel tubes infilling a tubular stainless steel frame, welded to form a monolithic assembly. Infill same tube size as adjoining fence construction.
 - 5. Infill: Comply with requirements for adjacent fence.
- B. Galvanizing: For steel items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A 123/A 123M unless otherwise indicated. For hardware items, hot-dip galvanize to comply with ASTM A 153/A 153M.

2.9 GATE OPERATORS

- A. General: Provide factory-assembled automatic operating system designed for gate size, type, weight, and operation frequency. Provide operation control system with characteristics suitable for Project conditions, with remote-control stations, safety devices, and weatherproof enclosures; coordinate electrical requirements with building electrical system.
 - 1. Provide operator designed so motor may be removed without disturbing limit-switch adjustment and without affecting auxiliary emergency operator.
 - 2. Provide operator with UL approval, or UL approved components.
 - 3. Provide electronic components with built-in troubleshooting diagnostic feature.
 - 4. Provide unit designed and wired for both right-hand/left-hand opening, permitting universal installation.
 - 5. Provide controllers, electrical devices, and wiring.
- B. Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 16220 "Electric Motors."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 2. Horsepower: $\frac{3}{4}$, unless otherwise indicated.
 3. Enclosure Type: As selected by the Commissioner.
 4. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
 5. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
 6. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections.
- C. Gate Operators: Concrete base mounted and as follows:
1. Hydraulic Slide Gate Operators:
 - a. Duty: Heavy duty, commercial/industrial.
 - b. Gate Speed: Minimum 45 feet per minute.
 - c. Maximum Gate Weight: As indicated on the Drawings.
 - d. Frequency of Use: Continuous duty.
 - e. Locking: Hydraulic in both directions.
 - f. Heater: Manufacturer's standard track and roller heater with thermostatic control.
- D. Remote Controls: Electric controls separated from gate and motor and drive mechanism, with NEMA ICS 6, Type 4 recessed or flush mounting, and with space for additional optional equipment. Provide the following remote-control device(s):
1. Control Station: Keyed, three-position switch with open, stop, and close function; located remotely from gate. Provide two keys per station.
- E. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor(s) causes operator to immediately function as follows:
1. Action: Stop gate in opening cycle and reverse gate in closing cycle and hold until clear of obstruction.
 2. Internal Sensor: Built-in torque or current monitor senses gate is obstructed.
 3. Sensor Edge: Contact-pressure-sensitive safety edge, profile, and sensitivity designed for type of gate and component indicated, in locations as follows. Connect to control circuit using gate edge transmitter and operator receiver system.
 - a. Along entire gate leaf leading edge.
 - b. Along entire gate leaf trailing edge.
- F. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop gate at fully retracted and fully extended positions.
- G. Emergency Release Mechanism: Quick-disconnect release of operator drive system of the following type of mechanism, permitting manual operation if operator fails. Design system so control-circuit power is disconnected during manual operation.
1. Type: Mechanical device, key, or crank-activated release.
- H. Operating Features:

1. Digital Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features. Provide unit that is isolated from voltage spikes and surges.
2. System Integration: With controlling circuit board capable of accepting any type of input from external devices.
3. Master/Slave Capability: Control stations designed and wired for gate pair operation.
4. Open Override Circuit: Designed to override closing commands.
5. Reversal Time Delay: Designed to protect gate system from shock load on reversal in both directions.
6. Maximum Run Timer: Designed to prevent damage to gate system by shutting down system if normal time to open gate is exceeded.

I. Accessories:

1. Warning Module: ADA/ABA-compliant, strobe-light alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving.
2. Battery Backup System: Battery-powered drive and access-control system, independent of primary drive system:
 - a. Fail Secure: Gate cycles on battery power, then fail safe when battery is discharged.
3. External electric-powered solenoid lock with delay timer allowing time for lock to release before gate operates.
4. Fire Postal box.
5. Fire strobe alarm.
6. Instructional, Safety, and Warning Labels and Signs: According to UL 325 and Manufacturer's standard for components and features specified

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
- B. Do not begin installation before final grading is completed unless otherwise permitted by Commissioner.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 DECORATIVE FENCE INSTALLATION

- A. Posts Set in Concrete: Refer to Drawings for setting details. Level and align fence components.

3.3 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.4 GROUNDING AND BONDING

- A. Fence Grounding: Install at maximum intervals of 1500 feet except as follows:
- B. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location.
- C. Connections: 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.
- D. Bonding to Lightning-Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning-protection down conductor or lightning-protection grounding conductor, complying with NFPA 780.

3.5 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware, gate operators, and other moving parts.

END OF SECTION 02826

SECTION 02930 - EXTERIOR PLANTS

PART 1 – GENERAL

1.1 RELATED DOCUMENT

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plant Material (Street Tree, Grass and Perennial Planting)
2. Fertilizer
3. Planting Soil
4. Structural Soil
5. Mulches
6. Tree stabilization Materials
7. Watering Devices
8. Flush Concrete Curb similar to Spec. Section 02771
9. Granite Block Pavement
10. Wicket Fence

B. Related Sections:

1. Division 01 Section "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings" for requirements related to VOC limits.
2. Division 02 Section "Earthwork" and Section "Excavation Support and Protection" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
3. Division 02 Section "Concrete Curbs, Headers and Sidewalks" for flush concrete curb work reference.
4. Division 09 Section "Exterior Painting" for painting of wicket fence.

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

- C. **Balled and Potted Stock:** Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. **Bare-Root Stock:** Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. **Container-Grown Stock:** Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- F. **Duff Layer:** The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- G. **Fabric Bag-Grown Stock:** Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- H. **Finish Grade:** Elevation of finished surface of planting soil.
- I. **Manufactured Topsoil:** Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- J. **Pesticide:** A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- K. **Pests:** Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- L. **Planting Area:** Areas to be planted.
- M. **Planting Soil:** Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- N. **Plant; Plants; Plant Material:** These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- O. **Root Flare:** Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- P. **Stem Girdling Roots:** Roots that encircle the stems (trunks) of trees below the soil surface.

- Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil. Insert other definitions if required to support planting requirements shown on Drawings.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, including soils.
 - 1. Inorganic Soil Amendments and Fertilizer: Include product label and manufacturer's application instructions specific to the Project.
- B. Samples for Verification: For each of the following:

Shredded bark mulch: 2 pound volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and makeup.
- C. Shop Drawings and Product Data of used Material for Wicket Fence showing full details of fabrication, coatings and installation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis of standard products.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Material Test Reports: For existing native surface topsoil, existing in-place surface soil and imported or manufactured topsoil.
- D. Maintenance Instructions: Recommended procedures to be established by City of New York for maintenance of plants during a calendar year. Submit before start of required maintenance periods.
- E. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.
 - 1. Experience: Five years' experience in landscape installation in addition to requirements in Division 1 Section "Quality Requirements."
 - 2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 3. Pesticide Applicator: State licensed, commercial.

- B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ration; deleterious material; pH; and mineral and plant-nutrient content of the soil.
 - 1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 - 2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Commissioner. A minimum of three existing on-site samples shall be taken from varied locations as determined by the Commissioner for each soil to be used or amended for planting purposes.
 - 3. Report suitability of tested soil for plant growth.
 - a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
 - 1. Selection of plants purchased under allowances will be made by Commissioner, who will tag plants at their place of growth before they are prepared for transplanting.
- E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 - 1. Trees: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.

2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- F. Plant Material Observation: Commissioner may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Commissioner retains right to observe trees further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees immediately from Project site.
 1. Notify Commissioner of sources of planting materials seven days in advance of delivery to site.
- G. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
- B. Bulk Materials:
 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.
- C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- D. Handle planting stock by root ball.
- E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.
- F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 2. Do not remove container-grown stock from containers before time of planting.
 3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.8 PROJECT CONDITIONS

- A. **Field Measurements:** Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. **Interruption of Existing Services or Utilities:** Do not interrupt services or utilities to facilities occupied by City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:
 - 1. Notify City of New York no fewer than two days in advance of proposed interruption of each service or utility.
 - 2. Do not proceed with interruption of services or utilities without the Commissioner's written permission.
- C. **Planting Restrictions:** Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. **Spring Planting:**
 - a. Deciduous plants: March 1 to May 1
 - 2. **Fall Planting:**
 - b. Deciduous plants: October 15 to December 15
- D. **Weather Limitations:** Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. **Special Warranty:** Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or incidents that are beyond Contractor's control.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. **Warranty Periods from Date of Substantial Completion:**
 - a. Trees, Perennials, and Ornamental Grasses: 12 months.

3. Include the following remedial actions as a minimum:
 - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
 - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.10 MAINTENANCE SERVICE

- A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of planting completion Substantial Completion.

- B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: Six months from date of Substantial Completion.

- C. Continuing Maintenance Proposal: From Installer to the City of New York, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 – PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.

2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Commissioner, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.
- E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
 2. Provide lime in form of ground dolomitic limestone or calcitic limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
- C. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

2.3 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 1. Organic Matter Content: 50 to 60 percent of dry weight.
 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

2.5 PLANTING SOILS

- A. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs, or marshes.
1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones $\frac{1}{2}$ " inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass; not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
 2. Organic content: Topsoil shall contain at least (5%) three percent organic matter determined by loss of ignition, of moisture-free samples dried in accordance with the current method of the Association of Official Agricultural Chemists. The organic content shall not to exceed (12%) eight percent.
 3. Acidity Range: pH 6.0% to pH 6.8% inclusive.
 4. Soil Textural Analysis: Planting Soil shall consist of the following percentages of sand, silt and clay.
 - a. Sand 40% to 75%
 - b. Silt 15% to 65%
 - c. Clay 20% maximum
 5. Electrical Conductivity: shall be maximum 1.50 mmhos/cm.
 6. Mix imported topsoil or manufactured topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
 - a. Volume of Loose Compost per 1000 Sq. Ft.: Rate based on recommendations of soil analysis report
 - b. Weight of Lime per 1000 Sq. Ft.: Rate based on recommendations of soil analysis report
 - c. Weight of Bonemeal per 1000 Sq. Ft.: Rate based on recommendations of soil analysis report
 - d. Weight of Commercial Fertilizer per 1000 Sq. Ft.: Rate based on recommendations of soil analysis report

2.6 CU-STRUCTURAL SOIL® COMPONENTS (for use as sub-base material under Granite Block Pavement)

- A. Structural Soil Foundation Material: Shall conform to CU-Soil™, as patented by Cornell University, patent #5,849,069 or equal. The product shall be obtained from a licensed supplier and proof of such licensing shall be submitted to the Commissioner prior to delivery. Tri-State licensed providers as of this date are East Coast Mines & Materials, Inc., East Quogue, NY 631-653-5445; Long Island Compost, Yaphank, NY, 631-379-7830, Custom Material Solutions, LLC., Baptistown, NJ, 732-850-1760, Country View, Inc. Somerset, NJ 732-560-8000; or Ascape Landscape, Blauvelt, NY, 845-353-6500. For further information on licensed providers or licensing requirements and application, contact Brian Kalter at Amereq Inc., New City, NY 800-832-8788 (patentholder rights granted to Amereq, Inc. by Cornell Research Foundation). Structural Soil components shall be mixed by the licensed producer to the following proportion:

Component Unit of Weight (Dry)

1. Crushed Stone 83%
2. Clay Loam 17%
3. Hydrogel 1 ounce per 200 pounds of stone

- B. Crushed Stone: Shall be crushed granite or traprock; no limestone or sandstone shall be accepted. No recycled material shall be accepted. Stone shall meet the AASHTO/ASTM C 33 requirements for #4 crushed angular stone graded within the following limits:

Passing Sieve (dry analysis)	Percent by Weight
2 inch	100%
1½ inch	90-100%
1 inch	20-55%
¾ inch	0-15%
⅜ inch	0-5%

Stone shall be clean and certified to meet NYCDOT aggregate soundness requirements for use in road construction. A single sized stone near one-inch (1") will be preferable to a wider size distribution or smaller single size stone fitting the general description.

- C. Clay Loam: Shall be as determined by the USDA Classification System and mechanical analysis, as per ASTM D422. Clay loam shall be of uniform composition, without admixture of subsoil, and free of stones greater than one-half inch (1/2") diameter, leaves, roots, debris, toxic materials, or lumps or clods over one inch (1") diameter. It shall have been obtained from naturally well drained areas which have never been previously stripped for topsoil and shall have a history of supporting satisfactory vegetative growth. It shall contain not less than two percent (2%) nor more than five percent (5%) organic matter, as determined by loss on ignition of oven-dried samples, dried to a constant weight at a temperature of 230°F, plus or minus 9°F.

Mechanical analysis for clay loam shall be as follows:

Textural Class	Percent of Total Weight (Dry)
Gravel	Less than 5%
Sand	20 - 45%
Silt	20 - 50%
Clay	20 - 40%

Clay loam shall meet or be amended to meet the following chemical analysis criteria:

1. pH between 5.5 and 6.5.
2. Organic matter 2 - 5 percent by dry weight.
3. Nutrient levels as required by the testing laboratory recommendations for the types of plants to be grown in the structural soil.
4. Toxic elements and compounds below the US EPA Standards for Exceptional Quality Sludge, or local standards, whichever are more stringent.
5. Soluble salts less than 1.0 millimho per cm.
6. Cation exchange capacity (CEC) greater than 10.
7. Carbon/ Nitrogen ratio less than 33:1.

Clay loam shall be the product of a commercial processing facility specializing in production of stripped natural topsoil. No clay loam shall come from USDA classified prime farmland.

D. pH Adjustment: To lower the clay loam pH to acceptable levels, commercial granular ferrous sulfate, ninety-six percent (96%) pure sulfur may be added to lower soil pH above 6.5. To raise pH levels, the manufacturer may add agricultural limestone containing a minimum of eighty-five percent (85%) carbonates. Minimum gradation: 100% passing 10 mesh sieve, 98% passing 20 mesh sieve, 55% passing 60 mesh sieve, and 40% passing 100 mesh sieve.

E. Hydrogel: Shall be Gelscape®, a potassium propenoate-propenamide copolymer hydrogel, as manufactured by Amereq, Inc., New City, N.Y., or approved tested equivalent. No substitution is recommended, since small changes in the hydrogel structure greatly change the quality of the structural soil.

F. CU-structural soil® mixing and quality control testing:

1. All CU-Structural Soil® mixing shall be performed at the licensed producer's yard using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. No mixing of CU-Structural Soil® at the project site shall be a uniformly blended urban tree mixture of crushed stone, clay loam and Gelscape® Hydrogel Tackifier, as produced by an Amereq-licensed company, mixed in the following proportion:

<u>Material</u>	<u>Unit of Weight</u>
specified crushed Stone	100 units dry weight
specified clay loam	20 – 25 units (to achieve minimum CBR of 50)
Gelscape® Hydrogel	0.035 units dry weight
Tackifier moisture	ASTM D698/AASHTO T-99 optimum moisture

2. Maintain adequate moisture content during the mixing process. Soils and mix components shall easily shred and break down without clumping. Soil clods shall easily break down into a fine crumbly texture. Soils shall not be overly wet or dry. The licensed producer shall

measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.

3. Raw materials shall be mixed off-site, only at the licensed producer's facility, on a flat asphalt or concrete paved surface to avoid soil contamination.
4. Should the independent laboratory test results of the clay loam reveal a need to amend it, to meet specifications, the amending materials should be added to the clay loam following the rates and recommendations provided by manufacturer.

2.7 MULCH

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 1. Type: Shredded Bark.
 2. Size Range: 3 inches maximum, 1/2 inch minimum.
 3. Color: Natural – not dyed.
 4. pH: 5.8. to 6.2

2.8 MISCELLANEOUS PRODUCTS

- A. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.
 1. Color: green.
- B. Fertilizer Tablets: Nutrient analysis of 12-8-8 and contain a minimum twelve percent (12%) humic acid by weight, biostimulants derived from sea kelp, amino acids, and a wetting agent derived from *Yucca schidigera*. Tablets shall contain a minimum 650,000 each of the following beneficial bacteria: nitrogen fixing, phosphorus solubilizing, and growth promoting.

2.9 TREE STABILIZATION MATERIALS

- A. Trunk Stabilization Materials:
 1. Upright and Guy Stakes: White cedar with bark attached, 3 inch diameter by 8 feet long for calipers up to 3 1/2 inch, pointed at one end.
 2. Tree Tie Webbing: 3/4" wide flat woven polypropylene tie, UV resistant, product: 'arbor-tie' or approved equal.

2.10 WATERING DEVICES

- A. Slow-Release Tree Irrigation Bag: Standard product manufactured for drip-irrigation of plants and emptying its water contents over a period of 6 to 10 hours; 20 gallon capacity, manufactured from UV-light stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.

2.11 GRANITE BLOCK PAVERS

- A. Granite Pavers shall comply with the requirements of "SECTION 2.06" NYC DOT Standard Highway Specifications.
- B. Aggregate Setting Bed Materials: sand and bedding and Joints shall comply with the requirements of "SECTION 6.06.3.C" NYC DOT Standard Highway Specifications.
- C. Geotextile:
 - 1. Shall be synthetic, non-woven and rotproof having no tears or defects which adversely alter its physical properties. Geotextile used shall conform to the following properties:

	ASTM Test	
Elongation	D4632	>=50%
Grab Strength	D4632	400N
Tear Strength	D4533	250N
Puncture Strength	D4833	250N
Permittivity (min)	D4491	.21/sec
Apparent Opening Size (max)	D4751	.25 mm

- 2. Geotextile shall be similar to FX-50HS by Carthage Mills, Cincinnati, OH; 160N, as manufactured by Mirafi, Charlotte, NC; AEF 880, as manufactured by Boom Environmental Products, New Bedford, MA, or approved equal.
- D. Cement Grout Joint Material (if required): Cement-grout shall meet the requirements of "Section 3.06", Type 2. NYC DOT Standard Highway Specifications.

2.12 WICKET FENCE

- A. Fences shall be constructed of steel rounds, angles and re-bars of the sizes and shapes shown on the Drawings. All steel shall conform to ASTM A-36 (ASTM A615 for re-bars).
- B. Prior to fabrication, the Contractor shall make all measurements at the location of the fence installation in order to insure correct fabrication and installation. New wicket fence shall be bent to conform to corners of curbs and walks.
- C. Steel rounds shall be formed into the shapes shown on the Drawings. Joints shall be completely welded with welds of proper size, shape and location. All welds shall be ground smooth to a neat finish.
- D. All steel rounds, angles and re-bars shall be galvanized and finish paint, see 2.11 Painting these Specifications.
- E. Concrete pavement or concrete flush curb for wicket fence used as footing shall conform to the Spec. Section 02771 Concrete Curbs, Headers and Sidewalks.

F. Painting

1. All fences and gates, before leaving the shop, shall be given one shop coat of paint.
2. Cleaning and Surface Preparation
 - a. Clean all steel first in accordance with SSPC-SP1.
 - b. Clean steelwork to be painted within the same day as it will be applied and in accordance with SSPC-SP2 or SSPC-SP6.
3. Shop Coat
 - a. Apply steel primer paint at a rate to provide dry film thickness of 2.0 to 4.0 mils. Provide full coverage of joints, corners, edges, and exposed surfaces.
4. Finish Paint
 - a. Second and Third coats shall be field applied.
 - b. All paints shall be applied when ambient air temperature is forty-five (45) degrees F. and rising and when surfaces to be painted are moisture free. No painting will be allowed below the minimum ambient air temperature. In addition, no painting will be allowed below the temperature at which moisture will condense on surfaces.
 - c. For color see Detail 3/L201.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions
 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by the Commissioner and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Locations, outline areas, adjust locations when requested, and obtain Commissioner's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 STRUCTURAL SOIL INSTALLATION

- A. CU-Soil™ should not be stockpiled long-term. Any CU-Soil™ not installed immediately should be protected by a tarp or other waterproof covering.
- B. Install CU-Structural Soil® in 6 inch lifts and compact each lift to 95% Proctor Density from a standard compaction curve AASHTO T 99 (ASTM D 698). No compaction shall occur when moisture content exceeds maximum as listed herein. Delay compaction if moisture content exceeds maximum allowable and protect CU-Structural Soil® during delays in compaction with plastic or plywood as directed by the engineer.
- C. Bring CU-Structural Soil® to finished grades in planting pits as shown on the drawings. Immediately protect the CU-Structural Soil® from contamination by toxic materials, trash, debris, water containing cement, clay, silt or materials that will alter the particle size distribution of the mix with plastic or plywood as directed by the Commissioner.

3.4 EXCAVATION FOR TREES

- A. Planting Pits and Trenches: Excavate planting pits with sides sloping inward. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 1. Excavate approximately three times as wide as ball diameter for balled and burlapped or container-grown stock.
 2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 4. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 5. Maintain supervision of excavations during working hours.
 6. Keep excavations covered or otherwise protected after working hours.
- B. Subsoil and topsoil removed from excavations may not be used as planting soil.
- C. Obstructions: Notify Commissioner if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Commissioner if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, ORNAMENTAL GRASS, AND PERENNIAL PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set balled and burlapped stock (trees) plumb and in center of planting pit with root flare 2 inches above adjacent finish grades.
 1. Use planting soil for backfill.
 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Set container-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
 1. Use planting soil for backfill
 2. Carefully remove root ball from container without damaging root ball or plant.
 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 5. Continue backfilling process. Water again after placing and tamping final layer of soil.

3.6 TREE STABILIZATION

- A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated on Drawings or directed by arborist.
 - 1. Upright Staking and Tying: Stake only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 36 inches for trees under 3 ½ inch caliper and 48 inches for trees over 3 ½ inch caliper below bottom of backfilled excavation. Set stakes vertical and space to avoid penetrating root balls or root masses.
 - 2. Support trees with bands of flexible ties (arbor ties) at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

3.7 TREE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Commissioner.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Commissioner, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.8 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.9 INSTALLING SLOW-RELEASE WATERING DEVICE

- A. Provide one device for each tree.
- B. Place device on top of the mulch at base of tree and fill with water according to manufacturer's written instructions.

3.10 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

- B. Watering, filling of watering device at least once per week.
- C. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

3.11 GRANITE BLOCK PAVEMENT INSTALLATION

- A. Examination: examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Preparation: Clean salvaged or new furnished granite block for relaying as per "Section 6.06.4.B" NYC DOT Standard Highway Specifications.
- C. Granite Block Pavement Installation, General:
 1. Install salvaged or new furnished granite block. Do not use salvaged granite block with chips, cracks, or discolorations that might be visible in finished work.
 2. Joint Pattern: As indicated on the drawings.
 3. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.
- D. Aggregate setting bed applications for granite block pavers:
 1. The earth subgrade, immediately before foundation material is placed on it, shall be compacted to a minimum of 95 percent of Standard Proctor Maximum Density, smooth, parallel to and at the required depth below the finished sidewalk surface and be dampened with water sufficient only to be absorbed by the subgrade. The subgrade shall not be in a muddy or frozen condition and unsuitable material shall be removed and replaced with acceptable material thoroughly compacted. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive geotextile and sand setting bed for unit pavers.
 2. Place geotextile over prepared subgrade, overlapping ends and edges at least 12 inches.
 3. Install sand setting bed over geotextile as per "Section 6.06.A" NYC DOT Standard Highway Specifications.
- E. Install salvaged or new furnished granite block with sand joints per "Section 6.06.AA" and "Section 6.06.BA" NYC DOT Standard Highway Specifications.
- F. Install salvaged or new furnished granite block with cement grout joint filler where shown on the drawings and as per "Section 6.06.4.AB" and "Section 6.06.BB" NYC DOT Standard Highway Specifications.
- G. Repairing, Pointing, and Cleaning – Granite Block Pavement
 1. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged. Provide new units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
 2. Pointing: During tooling of joints, enlarge voids or holes and completely fill with grout.
 3. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.

3.12 WICKET FENCE INSTALLATION

- A. Wicket shall be assembled in sixteen (10') foot long sections. All sections be welded together to form continuous fence.
- B. Wicket fence shall be installed adjacent to new concrete flush curb or new concrete pavement as shown on Drawings and as shown in Detail 2/L201. Wickets shall be truly vertical. The assembled wickets shall be welded to the galvanized plate and the plate attached to the concrete curb with the expansion anchors.
- C. After installation, chips, scrapes, and blemishes on the fence shall be touched up with a final field coat of approved paint. No paint shall be applied during damp weather or when the temperature is below freezing. During painting, all concrete work, paving, etc. shall be fully protected from stains. Any paint spots that may occur shall be removed immediately with an approved paint or stain remover.
- D. Any fence not set plumb and true to line and grade shall be removed and replaced at the Contractor's expense. The contractor shall maintain the fence during the life of the Contract and shall repair and replace all members that are disturbed, damaged or destroyed.

3.13 CLEANUP AND PROTECTION

- A. During planting, installation of granite block pavement and wicket fence keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site. Nursery tags and a complete list of plants installed shall be furnished to the Commissioner.

3.14 DISPOSAL

- A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off City of New York's property.

END OF SECTION 02930

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SECTION 03100 - CONCRETE FORMS AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. The work specified in this Section consists of all labor, materials, equipment and services necessary to design, furnish materials, fabricate, erect, and remove formwork, falsework and shoring, for cast-in-place structural concrete complete in place as shown on the Contract Drawings, as specified herein and as required for a complete installation in accordance with Contract requirements.
- B. The work includes all incidental and miscellaneous items not specified under another Section but required for the work of this Section, whether or not specifically referred to herein.
- C. In addition to the basic elements of formwork, the work specified in this Section includes the furnishing and installation of joints, sleeves, openings and embedded items into formwork as specified herein.
- D. Formwork for architectural cast-in-place concrete is not included in this Section but is specified in Section 03330 - Architectural Cast-in-Place Concrete. Architectural cast-in-place concrete includes formed concrete that is exposed to public view on the exterior façade of the building and all vertical concrete elements exposed to view on the exterior of the building, such as retaining walls and protection walls.
- E. This Section includes, but is not limited to, the following items:
 - 1. Lumber Forms
 - 2. Plywood Forms
 - 3. Steel Forms
 - 4. Form Ties
 - 5. Chamfer Strips
 - 6. Inserts and Embedments
 - 7. Form-Facing Materials
 - 8. Form Caulking
 - 9. Form Release Agent
 - 10. Shop Fabricated Forms
 - 11. Patching Material for Form-Tie Holes

1.2 RELATED SPECIFICATIONS

- A. Section 03200 - Concrete Reinforcement.
- B. Section 03300 - Cast-in-Place Structural Concrete.
- C. Section 03330 - Architectural Cast-in-Place Concrete.
- D. Section 03350 - Concrete Finishes.

1.3 REFERENCES

A. The work covered in this Section shall conform to the latest edition and latest addenda thereto of the following publications to the extent referenced. The publications are referred to in the text by the basic designation only.

1. American Concrete Institute (ACI):
 - a. ACI 301, Specifications for Structural Concrete.
 - b. ACI 347R, Guide to Formwork for Concrete.
 - c. ACI SP-4, Formwork for Concrete.
2. American Plywood Association (APA):
 - a. APA Grade – Trademarks.
3. American Society for Testing and Materials (ASTM):
 - a. ASTM A36, Carbon Structural Steel.
 - b. ASTM A572, High-Strength, Low Alloy Columbium-Vanadium Structural Steel.
 - c. ASTM A992, Steel for Structural Shapes for Use in Building Framing.
 - d. ASTM C39, Compressive Strength of Cylindrical Concrete Cylinders.
 - e. ASTM D6817, Rigid, Cellular Polystyrene Geofoam.
4. City of New York
 - a. New York City Building Code, Local Law 76/2008, latest edition and amendments or supplements thereto.
 - b. New York City Board of Standards and Appeals (BS&A) latest edition and amendments or supplements thereto.
5. U.S. Department of Commerce Product Standards:
 - a. PS 1-95 for Construction and Industrial Plywood.
6. Western Wood Products Association (WWPA):
 - a. WWPA Catalog "A" Product Use Manual.

1.4 DESIGN AND PERFORMANCE REQUIREMENTS

A. The Contractor shall assume sole responsibility for the engineering, design, fabrication, installation and removal of concrete formwork for cast-in-place structural concrete in conformance with the requirements of the Contract Drawings and Specifications and performed to achieve the highest standards of quality for visual and durable concrete. Design formwork to produce concrete members identical in shape, lines and dimensions to members shown on the Contract Drawings.

- B. Design of formwork for cast-in-place structural concrete, including layout, spans, fastenings, joints, framed openings, and shoring and reshoring systems, shall be performed under the direct supervision by a licensed Professional Engineer currently registered in the State of New York, retained by the Contractor and experienced in structural design of formwork, falsework and shoring for cast-in-place structural concrete.
- C. Design, fabricate, install and remove formwork for cast-in-place structural concrete in accordance with the provisions of ACI SP-4, ACI 347R and as specified herein. Refer to Section 03330 for materials, design, fabrication, installation and removal of formwork for architectural cast-in-place concrete.
- D. Design formwork to resist the loads and lateral pressures prescribed in ACI 347R and wind loads as specified by the New York City Building Code, Local Law 76/2008.
- E. Design formwork bulkheads at construction joints to accommodate protrusion of reinforcing steel dowels as detailed on approved Shop or Working Drawings prepared in conjunction with Section 03200 - Concrete Reinforcement.
- F. Performance Criteria: All cast-in-place structural concrete formwork shall be installed and removed without evidence of the following when the concrete is subject to imposed loads and pressures, temperature and weather conditions:
 - 1. Physical damage of any kind.
 - 2. Formwork fastening penetrations or formwork anchoring devices or projections other than approved form ties and specified embedded items.
 - 3. Incorrect or out of alignment profiles.
 - 4. Surface voids, sand pockets or discoloration due to fluid loss through the formwork.
 - 5. Rockpockets and honeycombs.
 - 6. Discoloration caused from staining and from improper placing of the concrete.
- G. Formwork surface materials: Use form surface material that will produce structural concrete surfaces conforming to the following and as required to obtain the indicated finishes:
 - 1. Concrete exposed to view: Use form surface material that will produce smooth, uniform, blemish-free concrete surfaces.
 - 2. Concrete concealed from view: Use form surface material that will produce concrete surfaces free of fins and honeycombs.
- H. Special Sections: Provide construction joints, openings, offsets, keyways, recesses, moldings, chamfers, blocking, screeds, bulkheads, waterstops, anchorages, inserts, and other features as required. Coordinate with other trades to ensure that all embedded items are installed and secure prior to concrete placement.
- I. Design formwork to be readily removable without impact, shock, or damage to uncured, green concrete surfaces and adjacent materials.

1.5 SUBMITTALS

- A. Prepare and submit the following in accordance with applicable Contract requirements:

1. Design Certification: Signed and sealed certification by a licensed Professional Engineer currently registered in the State of New York that structural designs for all field-constructed and prefabricated formwork for cast-in-place structural concrete to be used on this project, including falsework and shoring and re-shoring procedures for horizontal members, are prepared in accordance with applicable codes, standards and publications of the American Concrete Institute and the New York City Building Code, Local Law 76/2008, as referenced herein.
2. Shop and Working Drawings:
 - a. Submit Shop Drawings showing the layout and details of formwork required for all formed structural concrete work.
 - b. Formwork shop drawings shall include plans, elevations and sections to show layout of all structural concrete work and shall include all walls, columns, soffits, cast-in items, depressions, openings, recesses, reveals, ties, control joints, construction joints and water-stopped joints.
 - c. Shop drawings shall include the following:
 - 1) Details of shop assembly of formwork and details of field assembly of construction and control joints, reveals, recesses, embedments, ties, back-up bracing, and clean out panels.
 - 2) Proposed means to seal all joints, including back-up bracing, dry ties and brackets.
 - 3) Proposed means to maintain alignment, including back-up bracing.
 - 4) Concrete cover at all reinforcing steel.
 - 5) Location of clear placing passages through the steel reinforcement for placing trunks and hoses.
 - d. Submission of the Contractor's detailed Shop and Working Drawings of proposed formwork systems for cast-in-place structural concrete will be reviewed only for compliance with the Contract Documents.
 - e. Responsibility for completeness, accuracy and structural adequacy of proposed formwork systems depicted on Shop and Working Drawings shall lie with the Contractor.
3. Manufacturer's product data, compliance certification (as applicable) and installation instructions for the following:
 - a. Form ties and tie clamps
 - b. Inserts and embedments
 - c. Dovetail anchor slots
 - d. Form-facing materials
 - e. Form caulking or gasketing
 - f. Form release agent
 - g. Patching material for form-tie holes
4. Form Removal Schedule: Submit proposed schedule for form removal indicating minimum length of time for form removal proposed for each type of element.

5. Contractor's Surveyor: Submit qualifications of the Contractor's Surveyor to adequately survey all formwork and falsework locations, sleeves for conduits and pipes, openings and other embedments for future work.

1.6 QUALITY ASSURANCE

- A. All work shall comply with the provisions of the New York City Building Code, Local Law 76/2008, and the rules of the Board of Standards and Appeals, latest edition of each and amendments or supplements thereto.
- B. The Contractor shall assume responsibility for errors of detailing and fabrication and the correct fit of the formwork.
- C. Obtain submittal reviews before delivery of materials to the project site.
- D. Engage the services of a qualified and approved independent surveyor (Contractor's Surveyor) licensed in the State of New York in accordance with the provisions of the General Conditions for the performance of survey work specified herein.
- E. Coordinate the Work of this Section with the work of other trades so that construction is not delayed.
- F. Allowable Tolerances:
 1. Set and maintain concrete forms within tolerance limits stated in ACI 347R. Maintain more restrictive tolerances where required to meet project conditions.
 2. Formwork at exposed surface conditions, including slabs, beams, and walls shall not deviate more than 1/2 inch from indicated design locations. Pile caps and grade beams shall not deviate more than one inch from indicated design locations.
 3. Tolerances shall not be cumulative.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store form panels at least 2 inches above ground and maintain form panels in a well ventilated and dry location, protected against damage, exposure to weather and contamination that can affect concrete. Support forms to protect against warpage.
- B. Lift form panels by means that will protect them against damage and destruction. Support panels using strongbacks while lifting panels in a horizontal position.
- C. Deliver manufactured products in manufacturer's original packaging with identification marks intact.

1.8 PROJECT CONDITIONS

- A. After stake layout of on-site conditions, verify locations of on-site elements with the Commissioner and revise layout of formwork drawings as necessary to reflect adjustments and actual conditions.

- B. Protect formwork materials before, during and after erection to ensure acceptable finished concrete work. Protect in-place materials and other operations of work in connection with concrete placements.
- C. In the event of damage to erected forms, make necessary repairs or replacements prior to concrete placements at no expense to the City of New York.
- D. Allow sufficient times, as determined by the Commissioner from the approved schedule, between erection of forms and placing of concrete for the various trades to properly install their work.
- E. Do not apply external or superimposed loads, lateral or vertical, until concrete has developed the specified 28-day compressive strength and a minimum age of 14 days.
- F. Stay-in-place concrete forms are not permitted without the Commissioner's prior approval unless indicated on the Contract Drawings.

PART 2 - PRODUCTS

2.1 FORMWORK MATERIALS

A. Lumber Forms

- 1. Use only stress-grade lumber. Form framing, sheathing and shoring shall conform to WWPA Catalog A Product Use Manual.
- 2. For lumber in contact with concrete, use lumber dressed on at least the side contacting the concrete with dressed, tongue-and-groove or squared edges. Lumber shall be free of raised grain, knotholes, or other surface defects.
- 3. Other lumber may be dressed or rough.
- 4. Do not use lumber formwork where a smooth form finish is required; use plywood or steel forms.

B. Plywood Forms

- 1. Use only grade-marked plywood.
- 2. Use as a minimum B-B Plyform, Exterior Class 1 or 2, or HDO High Density concrete form plywood, Class 1 or 2 conforming to U.S. Product Standard PS 1.
- 3. Use thickness as required to maintain alignment and surface smoothness, but not less than 3/4-inch thick.

C. Steel Forms

- 1. Sheet Steel: Use commercial grade not less than 16 gauge.
- 2. Structural shapes: Use structural shapes that conform to ASTM A36, ASTM A992 or ASTM A572 Grade 50.
- 3. Fabricate panels in conformance with the Contractor's Shop or Working Drawings.
- 4. Maintain steel forms in rust-free condition by use of steel wool and light grinding, followed by coats of approved form release agent.
- 5. Reinforce outward facing surfaces as required to prevent warpage and deformation during concrete placement.

D. Form-Facing Materials

1. Form-Facing Panels for Finishes Indicated: Steel, glass-fiber-reinforced plastic, or other approved non-absorptive panel materials that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
2. Use structural plywood or other material that can absorb air trapped in pockets between the form and the concrete and surface paste produced by certain high water-cementitious materials ratio admixtures. Maximum form-facing material use is three times. Provide forms with a suitable form treatment to prevent bond of the concrete to the form.
3. As an alternate to using an absorptive wood form contact face as a form liner, use Zemdrain controlled permeability form liner manufactured by E. I. du Pont de Nemours or an approved equivalent product in strict accordance with the manufacturer's recommendations.

2.2 FORM ACCESSORIES

A. Form Ties:

1. Provide a cone-shaped, snap-in type form tie suitable for the intended use with a working load as required and with an integral, hot-forged head.
2. Provide a form tie system that, after break-off or removal, does not leave mild reinforcing steel within 2 inches of the exposed surface.
3. Wire, by itself, is not an acceptable form tie system.
4. Provide form ties and accessories that do not reduce the effective cover of concrete on the reinforcement.
5. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. A-2 Cone Snap-in Form Tie; Dayton Superior Concrete Accessories, Miamisburg, OH.
 - b. Plastic Cone Snapties; Award Metals, Baldwin Park, CA.
 - c. Plastic Cone Snap Tie; Form Tech Concrete Forms, Inc., Wixom, MI.
 - d. Or approved equal.

B. Chamfer Strips: Provide 3/4-inch by 3/4-inch triangular fillets for chamfered corners. Provide fillets constructed of metal, rigid plastic, elastomeric rubber, extruded vinyl or dressed wood milled from clear, straight-grain pine, surfaced each side, non-staining, furnished in longest practicable lengths.

C. Inserts: Provide galvanized cast steel or galvanized welded steel inserts, complete with anchors to concrete and fittings such as bolts, wedges and straps.

D. Form Caulking:

1. Provide a one-component, gun-grade silicone sealant that is capable of producing flush, watertight and non-absorbent surfaces and joints. Use sealant that is compatible with the type of forming material and concrete ingredients used.
2. VOC Limit: Provide form caulking (sealant) with maximum VOC content of 250 grams per liter.

3. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:

- a. Series 1200 Construction Caulking; GE Silicones, Waterford, NY.
- b. Dow Corning 999-A; Dow Corning Co., Midland, MI.
- c. Sikasil WS-290, Sika Corporation, Lyndhurst, NJ.
- d. Or approved equal.

E. Form Release Agent:

1. Provide a VOC-compliant, commercial formulation, colorless, form-coating compound that will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede wetting of surfaces to be cured with water or curing compounds. Product shall not cause surface dusting.
2. Formulate form-release agent with rust inhibitor for steel form-facing materials.
3. VOC Limit: Provide form release agent (sealer) with maximum VOC content of 200 grams per liter.
4. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. Magic Kote; Symons Corporation, Des Plaines, IL.
 - b. Debond Form Coating; L&M Construction Chemicals, Inc., Omaha, NE.
 - c. Specco F-100; Specco Industries, Chicago, IL.
 - d. Or approved equal.

- F. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800, Specification 810.1, Expanded Cellular Glazing Tape; minimum 1/4-inch thick by 3/4-inch wide.

- G. Form Joint Sealing Materials: Foam gaskets for sealing field-erected corner form joints shall be highly compressible foam rubber or neoprene tape. Elastomeric sealant or silicone caulk complying with ASTM C920, Type M or S, Grade NS, that adheres to form joint substrates.

- H. Form Sealer: Penetrating, clear, polyurethane wood form sealer formulated to reduce absorption of bleed water and prevent migration of set-retarding chemicals from wood.

- I. Surface Retarder: Chemical liquid set retarder, for application on form-facing materials, capable of temporarily delaying final hardening of newly placed concrete surface to depth of reveal specified.

- J. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required; of strength and character to maintain formwork in place while placing concrete.

2.3 SHOP FABRICATED FORMS

- A. Fabricate forms in accordance with the Contractor's Shop or Working Drawings.
- B. Maintain forms such that they remain clean, smooth, and free from imperfections, irregularities and warpage.

- C. Formwork Joints: Locate as indicated on the Contractor's Shop or Working Drawings. Note that horizontal construction joints in cast-in-place concrete shall be installed at locations shown on the Contract Drawings unless prior approval to deviate from those locations is obtained from the Commissioner.
- D. Arrange form panels in a symmetrical pattern conforming to the arrangement shown on the Contract Drawings. Use largest stock size practicable.
- E. Precisely align form panels on each side of the panel joint by means of fasteners common to both panels, to result in a continuous, unbroken concrete plane surface.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine the areas and conditions under which work of this Section is to be performed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected. Prior to placement of concrete, inspect forms for cleanliness, accuracy of alignment, strength and required inserts and openings.
- B. Earth cuts are not permitted for use as forms for vertical surfaces against which concrete will be cast, including electrical ductbanks, unless shown on the Contract Drawings, specified herein or as approved by the Commissioner for each specific case.
- C. Where different levels are indicated for wall footings, the footings shall be stepped. Unless otherwise indicated on the Contract Drawings, steps in wall footings shall not be of greater height than the thickness of the footings, and steps shall not lap less than 6 inches. No form shall be set at the back of such steps, and where earth has slumped off in such locations, it shall be cut back to a vertical plane just before the concrete is placed.

3.2 ERECTION AND INSTALLATION

- A. Construct forms in accordance with the provisions of ACI 301 and ACI 347R to required dimensions, plumb and straight, true to line and grade, and make all joints and seams mortar-tight. Fabricate forms so that the concrete can be adequately placed, vibrated and finished to achieve the specified finishes. Forms submerged in water shall be made watertight. Formwork shall be gasketed or otherwise rendered sufficiently tight to prevent leakage of paste or grout under heavy, high-frequency vibration.
- B. Securely brace and shore forms to prevent displacement and to safely support imposed concrete weight. Formwork shall be designed for full liquid head. Forms shall be completely rigid and of adequate strength to resist imposed hydraulic pressures without deflection, movement or fluid loss.
- C. Erect beam and girder soffits in accordance with the provisions of ACI 347R and to the standard tolerances delineated therein. Soffits shall be sufficiently braced, shored, and wedged to prevent deflection. Column sides shall be clamped in accordance with this specification with metal column clamps, spaced according to the manufacturer's directions.

- D. Chamfer above grade exposed joints, edges and external corners of concrete forms with a 3/4-inch by 3/4-inch triangular fillet unless otherwise indicated.
- E. Furnish forms for repeated use in sufficient number to ensure the required rate of progress. Clean forms and inspect immediately prior to depositing concrete. Remove deformed, broken or defective forms from the work site.
- F. Provide temporary openings where interior area of formwork is inaccessible for cleanout and removal of debris, 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 in forms in as inconspicuous a location as possible consistent with the requirements of the work.
- G. Provide openings in concrete formwork of the correct size and in the proper location to accommodate other operations of construction work in the project. Accurately place and securely support items to be built into forms. Install keyways and waterstops where shown on the Contract Drawings and as specified in Section 03300 - Cast-in-Place Structural Concrete.
- H. 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 the finished slab surface.
- I. Provide required finish on formed concrete surfaces for normal cast-in-place concrete in accordance with the provisions of Section 03350 - Concrete Finishes and as indicated on the Contract Drawings.
- J. Wet forms sufficiently to prevent joints in wood forms from opening prior to concrete placement.
- K. Cutting form ties back from the face of the concrete is prohibited.
- L. Apply form release agents in accordance with manufacturer's instructions and as specified herein:
 - 1. Coat form contact surfaces with approved form release agent compound before reinforcement is placed. Do not allow excess form release agent material to accumulate in the forms or to come into contact with surfaces which are required to be bonded to fresh concrete such as concrete reinforcement and embedded items.
 - 2. Before concrete placement, coat the contact surfaces of forms with a non-staining mineral oil, non-staining form coating compound, or two coats of nitrocellulose lacquer. Do not use mineral oil on forms for surfaces to which adhesive, paint, or other finish material is to be applied.
 - 3. Coat steel forms with non-staining, rust-preventive form oil or otherwise protect against rusting. Do not use rust-stained steel surfaces for contact with concrete.
 - 4. Do not allow form coatings to come in contact with construction joints or reinforcing steel.
- M. Observe formwork continuously while concrete is being placed to ensure that there are no deviations from desired elevation, alignment, plumbness and camber. If, during concrete placement, weakness develops and the formwork shows settlement, deflection or distortion, immediately stop the work, remove improperly cast concrete, and reconstruct the formwork to perform properly.

3.3 FORMWORK TOLERANCES

- A. Allowable Tolerances: Set and maintain formwork within the tolerance limits delineated in ACI 347R for structural concrete.
- B. Hydraulic Pressures: Design forms to limit deflections of members supporting facing panels to $L/400$ of the span length.

3.4 PROTECTION

- A. During installation, do not use forms as a storage platform nor as a working platform until the forms have been permanently fastened in position.
- B. Do not overload the surface of installed forms.

3.5 REMOVAL OF FORMS AND TIES

- A. Remove forms and supports in accordance with ACI 347R recommendations without damage to concrete and in a manner to insure complete safety to the structure and the public. Forms, form ties and bracing shall not be removed without specific permission of the Contractor's licensed Professional Engineer registered in New York State.
- B. In general, do not remove forms until the concrete has hardened sufficiently to safely support its own load, plus any superimposed load that might be placed thereon. Forms shall remain in place for the minimum time periods specified in ACI 347R, except that forms may be removed earlier than specified if ASTM C39 test results of field-cured samples from a representative portion of the structure or other approved and calibrated non-destructive testing techniques show that the concrete has reached a minimum of 85 percent of the specified design strength.
- C. Remove top forms on sloping surfaces of concrete as soon as removal operations will not allow the concrete to sag. Perform needed repairs or treatment required on sloping surfaces at once followed immediately with the specified curing.
- D. Whenever formwork is removed during the specified minimum curing period, continue curing the exposed concrete surfaces in accordance with one of the methods specified in Section 03300 - Cast-in-Place Structural Concrete.
- E. Upon removal of forms, notify the Commissioner in order that a review of the newly stripped surfaces may be made before patching.
- F. Loosen wood forms for wall openings without causing damage to the concrete. Avoid prying against the face of finished concrete. Use only wooden wedges.
- G. Take care in removing forms, wales, supports and form ties to avoid spalling or marring the concrete. Initiate rubbed finish, if required, and necessary patching immediately after removal.
- H. Patch form tie holes with an approved non-shrink patching material in accordance with the manufacturer's recommendations and subject to approval.

- I. Hammer-pack holes left by tie rods with stiff mortar of the same material as, but somewhat leaner than that in the concrete. Render the patch inconspicuous to view. Complete patching within 24 hours of form removal.

3.6 RE-USE OF FORMS

- A. Forms for re-use shall meet new form requirements with respect to effect on cast-in-place concrete appearance and structural stability.
- B. Limit reuse of plywood to no more than three times. Re-use may be further limited by the Commissioner if it is found that the pores of the plywood are clogged with paste to the degree that the wood does not absorb the air or surface paste produced by certain high water-cementitious materials ratio admixtures.
- C. Re-use of forms shall in no way delay or change the concrete placement schedule as compared to the schedule obtainable if all forms were new (in the case of wood forms) or if the total required forms were available (in the case of steel forms).
- D. Clean and re-oil formwork prior to re-use. Plywood forms may not be re-used if unused holes from form ties exist from a previous use.

END OF SECTION 03100

SECTION 03200 – CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. The work specified in this Section consists of all labor, materials, equipment and services necessary to furnish, fabricate and install concrete reinforcement for cast-in-place architectural and structural concrete, complete in place as shown on the Contract Drawings, as specified herein and as required for a complete installation in accordance with Contract requirements.
- B. Provide epoxy-coated steel reinforcement for all cast-in-place concrete structures and elements specified in Section 03300 – Cast-in-Place Structural Concrete and Section 03330 – Architectural Cast-in-Place Concrete except as noted below or indicated elsewhere in the Contract Drawings or Specifications.
 - 1. Provide galvanized welded wire reinforcement for cast-in-place concrete topping overlay on the ground floor slab and roof slab of the Salt Shed.
 - 2. Provide uncoated carbon steel reinforcement for the protection walls, and underground rainwater collection vault, except for the dowels into the ground floor slab.
 - 3. Provide uncoated prestressed, threaded steel reinforcement for caisson piles.
- C. Provide an add alternate for stainless steel reinforcement for all cast-in-place concrete structures and elements specified in Section 03300 – Cast-in-Place Structural Concrete and Section 03330 – Architectural Cast-in-Place Concrete except as noted above in Paragraphs B.1 through B.3.
- D. Provide reinforcing steel accessories for architectural cast-in-place concrete as specified in Section 03330.
- E. This Section includes, but is not limited to, the following items:
 - 1. Carbon Steel Reinforcing Bars, Uncoated.
 - 2. Carbon Steel Reinforcing Bars, Epoxy Coated.
 - 3. Stainless Steel Reinforcing Bars (Add Alternate).
 - 4. Prestressed Threaded Bars, Uncoated.
 - 5. Welded Wire Reinforcement, Galvanized.
 - 6. Steel Tie Wire, Uncoated, Epoxy Coated or Galvanized.
 - 7. Steel Tie Wire: Stainless Steel (Add Alternate).
 - 8. Supports for Reinforcement.
 - 9. Exothermic Welded Splices.
 - 10. Epoxy Coating Repair.
- F. Epoxy resin for grouting reinforcement dowels is not included in this Section but is specified in Section 03300 - Cast-in-Place Structural Concrete.
- G. The work includes all incidental and miscellaneous items not specified under another Section but required for the work of this Section, whether or not specifically referred to herein.

1.2 RELATED SPECIFICATIONS

- A. Section 02470 – Drilled Caisson Piles.
- B. Section 03300 – Cast-in-Place Structural Concrete.
- C. Section 03330 – Architectural Cast-in-Place Concrete.

1.3 REFERENCES

- A. The work covered in this Section shall conform to the latest edition and latest addenda thereto of the following publications to the extent referenced. The publications are referred to in the text by the basic designation only.
 - 1. American Concrete Institute (ACI):
 - a. ACI 301, Standard Specifications for Structural Concrete.
 - b. ACI 315, Manual for Standard Practice for Detailing Reinforced Concrete Structures.
 - c. ACI 318, Building Code Requirements for Reinforced Concrete.
 - d. ACI SP66, Detailing Manual.
 - 2. American National Standards Institute/American Welding Society (ANSI/AWS)
 - a. D1.4, Structural Welding Code - Reinforcing Steel.
 - b. D1.6, Structural Welding Code - Stainless Steel.
 - 3. American Society for Testing and Materials (ASTM):
 - a. ASTM A82, Steel Wire, Plain, for Concrete Reinforcement.
 - b. ASTM A185, Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - c. ASTM A496, Steel Wire, Deformed, for Concrete Reinforcement.
 - d. ASTM A497, Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
 - e. ASTM A615/A615M, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - f. ASTM A775/A775M, Epoxy-Coated Reinforcing Steel Bars.
 - g. ASTM A884, Epoxy-Coated Steel Wire and Welded Wire Fabric for Concrete Reinforcement.
 - h. ASTM A955/A955M, Deformed and Plain Stainless Steel Bars for Concrete Reinforcement.
 - i. ASTM A1022/A1022M, Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement.
 - j. ASTM D3963/D3963M, Fabrication and Jobsite Handling of Epoxy-Coated Reinforcing Steel Bars.
 - 4. Concrete Reinforcing Steel Institute (CRSI), DA4, Manual of Standard Practice.
 - 5. Society for Protective Coatings (SSPC), Steel Structures Painting Manual.
 - a. SSPC-SP-10/NACE No. 2, Near-White Blast Cleaning.

6. City of New York:
 - a. New York City Building Code, Local Law No. 76/2008, latest edition and amendments or supplements thereto.
 - b. New York City Board of Standards and Appeals (BS&A), latest edition and amendments or supplements thereto.

1.4 SUBMITTALS

A. Submit the following in accordance with applicable Contract requirements:

1. Shop Drawings:

- a. Detailed placing and shop fabrication drawings shall show fabrication, bending and placement of concrete reinforcement prepared in conformance with ACI 315.
 - b. Shop Drawings shall show bar schedules, stirrup spacing, diagrams of bent bar arrangements and assemblies, arrangement of concrete reinforcement, location and length of lap splices, special reinforcement required at openings through concrete structures or at embedments, supports, accessories, and concrete cover to the extent necessary for proper fabrication and placement of concrete reinforcement.
 - c. Shop Drawings shall be made to such a scale as to clearly show joint locations, openings, and the arrangement, spacing and splicing of reinforcement.
2. Manufacturer's specifications and installation instructions for all proprietary materials and reinforcement accessories.
 3. Material specifications and mill test certification reports for reinforcing steel and welded wire reinforcement, showing physical and chemical analyses.
 4. Description of proposed supports for each type and location of reinforcement.
 5. Description of reinforcing weld locations and weld procedures.
 6. Certification from an independent testing laboratory that mechanical connectors for reinforcing steel comply with specified requirements.
 7. Welders Certificates: Certify welders employed in the work, verifying AWS qualification within the previous 12 months.
 8. Evidence that the epoxy-coating applicator is certified by CRSI.

B. Shop Drawings shall also indicate the following requests, as applicable:

1. Request to relocate any bars that cause interferences or that cause placement tolerances to be violated.
2. Request to use splices not shown on the Contract Drawings.
3. Request to use mechanical couplers accompanied by manufacturer's literature, installation instructions and certified load capacity test reports.
4. Request for placement of column dowels without the use of templates.
5. Request and procedure to field bend or straighten partially embedded reinforcing bars.

C. Develop Shop Drawings based upon field-verified dimensions and elevations of existing or partially constructed structure, where applicable, to allow proper review of Shop Drawings.

- D. Prepare reinforcement placing drawings to provide a complete dimensioned representation of the arrangement of reinforcement to allow placement without reference to the Contract Drawings, including location of reinforcing steel, support bars, chairs and bolsters, locations of construction, expansion and control joints, and sequence of concrete placements.
- E. Prepare complete elevations of all walls and complete plans of all slabs, except where two or more walls or slabs are identical, and identify diameter and spacing of wall and slab reinforcing steel on such views. Prepare sections to clarify the arrangement of the steel reinforcement, and identify by diameter but not spacing of wall and slab reinforcement in such sections. For all reinforcing bars, unless the location of the bar is clear, provide a dimension from the bar or bars to a readily distinguishable structural feature on the drawing to facilitate placement.
- F. Check Shop Drawings for completeness and accuracy and make necessary corrections prior to submittal for review and approval. Obtain Commissioner's approval prior to fabrication.
- G. Review of Shop Drawings will be for general considerations and design intent only. Compliance with specified requirements for materials, fabrication and placement of concrete reinforcement shall be the Contractor's responsibility.

1.5 QUALITY ASSURANCE

- A. All work shall comply with the provisions of the New York City Building Code, Local Law No. 76/2008, and the rules of the Board of Standards and Appeals, latest edition of each and amendments or supplements thereto.
- B. Testing and Inspection
 - 1. Fabrication, placement and welding of reinforcing steel shall be subject to special inspection in the mill, shop and field in accordance with the requirements of the New York City Building Code, Local Law 76/2008 and applicable Contract provisions. Special inspection and testing services required by the New York City Building Code, Local Law 76/2008 will be provided by the Special Inspector. Construction inspection and testing of work not regulated under special inspection but covered under this Section will be performed under the direction of the Commissioner.
 - 2. Special Inspections
 - a. 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 New York City Construction Codes shall 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 2008 New York City Construction Codes requirements or as additionally may be called for in the Specifications. The Special Inspector shall be an entity compliant with the requirements of the 2008 New York City Construction Codes.
 - b. The Contractor shall notify the relevant Special Inspector in writing at least 72 hours before the commencement of any work requiring Special Inspection. The Contractor shall be responsible for, and bear related costs, to assure that all

construction or work shall remain accessible and exposed for inspection purposes until the required inspection is completed.

- c. Inspections and tests performed under Special Inspections shall 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. Failure of a special inspection to detect a defect in materials or workmanship shall not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

C. The epoxy-coating applicator shall be certified by CRSI under the "CRSI Fusion-Bonded Epoxy Coating Applicator Plant Certification Program".

D. Allowable Tolerances

- 1. Fabrication: Deviations from indicated dimensions (plus or minus) in excess of the following will not be permitted.
 - a. Sheared length: 1 inch
 - b. Height of truss bars: 1/2 inch
 - c. Stirrups, ties, and spirals: 1/2 inch
 - d. Bent length: 1 inch
- 2. Placement: Conform to the requirements specified in ACI 318 and comply with CRSI recommended practice as specified herein.

E. Weld and Welder Qualifications: Depending on type of concrete reinforcement, perform welding of reinforcing steel using only welders qualified in accordance with AWS D1.4 or D1.6. Perform welding procedure qualification, except for pre-qualified procedures, as required by AWS D1.4 or D1.6 as applicable, prior to executing welding of reinforcing steel.

F. Coordinate work of this Section with the work of other trades so that construction is not delayed.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Ship concrete reinforcement from source in bundles of one size and length, securely tied and identified with plastic tag showing specification number, grade, heat number, bundle number, and name and location of mill.
- B. Upon delivery to job site, store reinforcement in neat bundles, tagged for placement and properly identified for coordination with mill test reports.
- C. Identify each group of bent and straight bars with a metal tag providing the identifying member corresponding to the shop drawing and bar schedule.
- D. Store concrete reinforcement above ground surface and support as required to prevent formation of kinks, distortions, excessive rusting, contamination by oil, mud, and other materials that could destroy its usefulness. Protect reinforcement from exposure to weather at all times prior to

placement by suitable covering. Protect reinforcement from conditions conducive to corrosion at all times until concrete is placed around it.

- E. Bulk delivery of reinforcement steel will not be permitted.
- F. Thoroughly clean the surfaces of reinforcing steel and accessories to be in contact with concrete of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances just prior to concrete placement. Where there is a delay in concrete placement, re-inspect and re-clean reinforcement if necessary.
- G. Perform job site handling of epoxy-coated reinforcing steel bars and accessories in accordance with ASTM D3963/D3963M.

1.7 PROJECT CONDITIONS

A. Field Measurements

1. Prior to commencement of the work, field verify existing dimensions, elevations, locations and conditions applicable to the work. Report variances and discrepancies from the Contract Drawings and potential interferences promptly to the Commissioner.
2. Take sufficient field measurements prior to preparation of Shop Drawings and fabrication of construction materials, where possible, to ensure proper fitting of the work. However, do not delay job progress. Allow for adjustments and fitting wherever the taking of field measurements before fabrication may not be possible or might delay the work.
3. Actual field-verified conditions may require modifications to the construction details indicated on the Contract Drawings. Perform the work to meet actual field conditions encountered. Submit a record of variances and discrepancies on drawings to the Commissioner to document actual field-verified conditions.

PART 2 - PRODUCTS

2.1 REINFORCEMENT MATERIALS

- A. Carbon Steel Reinforcing Bars, Uncoated: Provide deformed billet steel reinforcing bars, conforming to ASTM A615/A615M, Grade 60, where noted in the Specifications or shown on the Contract Drawings.
- B. Carbon Steel Reinforcing Bars, Epoxy Coated: Provide epoxy-coated steel reinforcing bars that conform to ASTM A615/A615M, Grade 60, deformed billet steel bars, and to ASTM A775/A775M for epoxy coating. Provide light color shades in the coating color that will reveal rusted or undercoated areas of steel.
- C. Stainless Steel Reinforcing Bars: Provide stainless steel reinforcing bars that conform to ASTM A955/A955M, Alloy Type 2205, UNS Designation No. S31803, Grade 75, where specified herein (Add Alternate).
- D. Reinforcing Bars for Caisson Piles: Provide uncoated, fully threaded, high strength, ASTM A615/A615M, Grade 75 (minimum 75 ksi yield strength) steel reinforcing bars where shown or noted on the Contract Drawings or specified in Section 02470.

1. Approved splice couplers and spacers produced by the same manufacturer as the threaded reinforcing bar may be used for threaded bars. Welding of threaded bars will not be permitted.
 2. Acceptable products/manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. SAS Thread Bar System, as manufactured by SAS Stressteel, Inc., Fairfield, NJ.
 - b. All-Thread Rebar System, as manufactured by Williams Form Engineering Corp., Belmont, MI.
 - c. Threadbar Reinforcing System, as manufactured by Dywidag-Systems International USA Inc., Bolingbrook, IL.
 - d. Or approved equal.
- E. Welded Wire Reinforcement, Galvanized: Provide galvanized welded wire reinforcement in flat sheets conforming to ASTM A185 for plain wire or ASTM A497 for deformed wire.
- F. Steel Wire, Uncoated, Epoxy Coated or Galvanized: ASTM A82, plain, cold drawn steel or ASTM A496, deformed, size D4 and larger. Use for securing reinforcing bars and embedded items. Use epoxy-coated steel wire conforming to ASTM A884 in conjunction with epoxy-coated reinforcing steel. Use hot-dip galvanized steel wire in conjunction with galvanized welded wire reinforcement and embedments.
- G. Steel Wire, Stainless Steel: Conform to ASTM A1022/A1022M (Add Alternate).

2.2 SUPPORTS FOR REINFORCEMENT

- A. Wire Bar Supports: Provide supports for reinforcement including 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 recommendations, unless otherwise approved.
1. Use Class 1 (plastic protected) stainless steel wire bar type supports complying with maximum protection recommendations of CRSI Manual of Standard Practice DA4 for formed surfaces exposed to weather or to view.
 2. Use Class 2, moderate protection, wire bar supports for all other conditions.
 3. For slabs placed on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 4. The use of concrete bricks, or other similar supports, is prohibited.

2.3 WELDING

- A. When required or permitted, all welding of reinforcing bars shall conform to ANSI/AWS D1.4 or D1.6 depending on type of concrete reinforcement. Unless otherwise specifically permitted by the Commissioner, welding of crossing bars (tack welding) for assembly of reinforcement is prohibited.
- B. Welding of wire to wire, and of wire or welded wire reinforcement to reinforcing bars or structural steel, shall conform to applicable provisions of ANSI/AWS D1.4 or D1.6 as applicable and any supplementary requirements specified by the Commissioner for the particular application.

2.4 EXOTHERMIC WELDED SPLICES

- A. Where applicable, use a welded butt splice system in conformance with ACI 301 that develops a minimum of 125 percent of the specified yield strength of the reinforcing bar in tension and compression via an exothermic load transfer between the bar deformations and an internally grooved sleeve. Coat connectors in accordance with same requirements as reinforcing bars.
- B. Acceptable products/manufacturers: Subject to compliance with requirements, provide one of the following:
 - 1. Cadweld, Erico, Inc., Cleveland, OH.
 - 2. ThermOweld Process, Continental Industries, Tulsa, OK.
 - 3. TerraWeld, Alltec Corporation, Canton, NC.

PART 3 - Or approved equal.EXECUTION

3.1 FABRICATION

- A. General: Conform to the accepted Shop Drawings.
- B. Cutting and Bending: Conform to requirements of ACI 318 and ACI 315. Perform cutting and bending of reinforcing bars in shop before shipment to the site unless written approval for field bending is obtained from the Commissioner or is required by local labor jurisdiction. Bend all bars cold unless permitted by the Commissioner in writing. Do not bend or straighten bars in a manner that could damage the materials.
- C. Fabricate reinforcing bars in accordance with the standard fabricating tolerances in Figures 4 and 5 of ACI 315. Tolerances shall not permit a reduction in concrete cover.
- D. Epoxy Coating: Prepare concrete reinforcement to be epoxy coated by abrasive blast cleaning to near-white metal in accordance with SSPC-SP-10. Apply coating by electrostatic spray method as soon thereafter as possible in accordance with the recommendations of the manufacturers of the coating material.

3.2 EXAMINATION

- A. Verify that surface over which concrete is to be placed is clean and in proper condition for installing reinforcement.
- B. Verify that embedded items and blockouts are secured in place.
- C. Verify that formwork supports are complete, secure and in place.

3.3 INSTALLATION

- A. General: Comply with provisions of ACI 301 and as herein specified.
- B. Clean reinforcement, as required, to remove loose rust, mill scale, earth, ice, grease, oil, clay or foreign substances that could reduce bond of reinforcement with concrete.

- C. Arrange and place reinforcement as indicated on the accepted bending diagrams and placement plans.
- D. Positively secure reinforcement and welded wire fabric against displacement during placement of concrete. Wire or clip bars together in accordance with ACI recommendations. Tack welding of reinforcement is not permitted.
- E. With formwork for as-cast finish, use spacers which will not be visible at exposed finish and which will be sheathed in nylon to the depth of minimum cover as required.
- F. Concrete Cover Requirements:
1. Accurately position reinforcement, including stirrups, to achieve a clear coverage for concrete protection, measured from outside of bar or welded wire reinforcement to surface of concrete, as detailed on the approved Shop Drawings or as directed by the Commissioner.
 2. Minimum concrete cover for reinforcement is shown below unless otherwise indicated on the Contract Drawings. Placement tolerance is plus 1/4 inch, minus 0 inch. Cover to principal reinforcement shall be not less than two times the nominal maximum aggregate size nor less than 1.5 times the effective diameter of the reinforcing bars.

<u>Minimum Concrete Cover for Reinforcement</u>	
<u>Description</u>	<u>Minimum Cover (inches)</u>
1. Concrete cast against and permanently exposed to earth	3
2. Concrete exposed to earth, liquids or weather:	
a. Principal reinforcement	2-1/2
b. Stirrups, ties and spirals	2
3. Concrete not exposed to liquids or weather or in contact with earth:	
a. Principal reinforcement	2-1/2
b. Stirrups, ties and spirals	2
4. Structural concrete wall surface exposed to salt	3
5. Structural concrete floor:	
a. Top reinforcement	2-1/2
b. Bottom reinforcement	2
6. Concrete topping overlay (welded wire reinforcement from top of slab)	
a. Ground floor overlay	1-1/2
b. Roof overlay	1
7. Footings and base slabs:	
a. At formed sides and ends and at bottoms bearing on concrete work mat	2
b. At unformed surfaces and bottoms in contact with earth	3
c. Top of footings	2
d. Over top of caissons	2

- G. Do not place reinforcement continuous through expansion joints. Reinforcement shall be continuous through construction and control joints.

- H. Reinforcement or other embedded metal items bonded to the concrete shall not be continuous through any joint intended as an expansion joint. Dowels bonded on only one side of a joint and waterstops may extend through the joint.
- I. Place and secure reinforcement bars and welded wire reinforcement in position by means of accepted non-corrosive spacers, supports, chairs, runners, standees, bolsters or hangers as required.
- J. Do not field bend reinforcing bars partially embedded in concrete without the Commissioner's written approval.
- K. Welding: Welding of reinforcing steel is not permitted, unless approved by the Commissioner in advance for each specific application. Perform welds in accordance with ANSI/AWS D1.4.
- L. Moving bars to avoid interference with other reinforcement, conduits or embedded items exceeding the specified tolerances is subject to prior written approval of the Commissioner.
- M. Exposed Reinforcement: Reinforcement left exposed for the bonding of future construction shall be effectively protected from corrosion by encasement in cement mortar or lean concrete or by other temporary covering approved by the Commissioner.
- N. Field Cutting of Reinforcement: Reinforcement shall not be cut in the field except when specifically permitted in writing by the Commissioner.
- O. Repair of Epoxy Coating: Repair damage to epoxy coating either as described in ASTM D3963/D3963M or by mechanical wire brush cleaning and painting with an approved epoxy paint using the paint manufacturer's approved procedure. Repair reinforcement with visible signs of rust. Repair of damaged epoxy coating of more than five percent of the total reinforcement surface area will not be allowed.
- P. Concrete Reinforcement for Caisson Piles: Install threaded steel reinforcing bars in caisson piles as shown on the Contract Drawings, as described in Section 02470 - Caisson Piles, and in accordance with the manufacturer's instructions.

3.4 SUPPORTS AND SPACERS FOR REINFORCEMENT AND WELDED WIRE REINFORCEMENT

- A. Support reinforcing bars and welded wire reinforcement in position by means of accepted spacers, chairs or hangers.
- B. Install sufficient number of supports and of strength to withstand deflection of reinforcement from indicated cross-sectional position. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
- C. Do not use stones, brick, wood blocks or pieces of broken concrete to support reinforcing steel.

3.5 SPLICING

- A. Locate splices as indicated on the approved Shop Drawings or as directed by the Commissioner. When it is necessary to splice reinforcing at points other than where shown, the character of the splice shall require approval by the Commissioner.
- B. Provide splices in accordance with the required lengths given on the Contract Drawings and in conformance with ACI 318 and ACI 315. Do not splice at points of maximum stress.
- C. Mechanical couplers and exothermic welded splices shall be used only where shown on the Contract Drawings unless permitted in writing by the Commissioner. Prepare ends of bars to be exothermically welded, insert ends into high strength welding sleeve and follow welding procedures in strict accordance with manufacturer's instructions.
- D. Couplers located at a joint face shall be a type which can be set either flush or recessed from the face as shown on the Contract Drawings. Seal couplers during concrete placement to completely eliminate concrete or cement paste from entering. After concrete is placed, couplers intended for future connections shall be plugged and sealed to prevent contact with water or other corrosive materials. Threaded couplers shall be plugged with plastic plugs which have an O-ring seal.

3.6 WELDED WIRE REINFORCEMENT PLACEMENT

- A. Install in as long lengths as practicable. Lap adjoining pieces at least one full mesh size and attach splices with No. 14 gauge tie wire, one tie for each running foot. Wires shall be staggered and tied in such a manner that they cannot slip. Offset end laps in adjacent widths to prevent continuous laps in either direction.
- B. Welded wire reinforcement for slabs on grade shall extend to within 2 inches of the concrete edge. Welded wire reinforcement shall extend through construction and contraction joints unless otherwise shown on the Contract Drawings.
- C. Adequately support welded wire reinforcement to assure proper positioning in the slab. Secure and support all welded wire reinforcement in the final location prior to the placement of concrete. The use of rakes to pull welded wire reinforcement into place or pushing welded wire reinforcement into place is prohibited.

3.7 FIELD QUALITY CONTROL

- A. Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Do not install reinforcement or welded wire reinforcement without approved placement drawings on site. Prior to concrete placement, inspect the installed reinforcement and welded wire reinforcement for acceptable condition, compliance with approved Shop Drawings, adequate support against displacement, and proper concrete cover and location. Correct deficiencies prior to placing concrete. Concrete placed in violation of this provision may be rejected with subsequent removal by the Contractor at no cost to the City of New York.
- C. Unacceptable Materials: Do not use reinforcement with any of the following defects:

1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
2. Bends not indicated on the approved Shop Drawings.
3. Kinks, gouges, excessive rust, deleterious materials, or other visible damage.

END OF SECTION 03200

SECTION 03300 - CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. The work specified in this Section consists of providing all labor, materials, equipment, services and incidentals necessary to furnish and install normal weight cast-in-place concrete complete in place as indicated on the Contract Drawings, as specified herein and as required for a complete installation in all respects.
- B. The work includes producing concrete consisting of specified constituents; development and control of concrete mixture designs; storage and quality control of concrete ingredients; and batching, mixing, production quality control and delivering of concrete of specified compressive strength class, maximum size aggregate, and slump. The work also consists of placing, curing and protecting cast-in-place structural concrete, reinforced and non-reinforced as required. The work also includes providing openings in concrete; embedded items such as reinforcement, sleeves, frames, anchor bolts and inserts; and concrete equipment bases and support structures, all as required to facilitate work under this and other Sections.
- C. The work covered in this Section includes but is not necessarily limited to the following uses of cast-in-place concrete:
 - 1. Cast-in-place structural concrete for use in the building, protection walls and appurtenant structures.
 - 2. Cast-in-place architectural concrete that is formed concrete exposed to public view on the exterior façade of the building and all vertical concrete elements exposed to view on the exterior of the building and protection walls.
 - 3. Cast-in-place concrete topping overlays located at the ground floor and roof slabs of the building.
 - 4. Cast-in-place concrete fill for use in caisson piles as specified in Section 02470.
- D. Cast-in-place concrete for uses specified elsewhere:
 - 1. Cast-in-place concrete for use in concrete paving, curbing, headers, sidewalks and appurtenant items is specified herein but uses are described in Section 02771.
- E. Finishing of cast-in-place structural concrete surfaces shall conform to the requirements described in Section 03350. Finishing of cast-in-place architectural concrete surfaces shall conform to the requirements described in Section 03330.
- F. The work covered in this Section does not include precast concrete hollow core planks which are specified in Section 03411.
- G. Grout materials and grouting of caisson piles are not included in this Section, but are specified in Section 02470.
- H. The work includes all incidental and miscellaneous items not specified under another Section but required for the work of this Section, whether or not specifically referred to herein.

I. This Section includes, but is not limited to, the following items:

1. Portland Cement
2. Ground Granulated Blast Furnace Slag
3. Fine Aggregate
4. Coarse Aggregate
5. Water
6. Concrete Admixtures
7. Epoxy Bonding Agent
8. Curing and Protection Materials
9. Preformed Compressible Joint Filler
10. Joint Sealant and Backer Rod
11. Construction Joint Filler
12. Epoxy Resin for Grouting Dowels
13. Non-shrink Grout
14. PVC Waterstops

1.2 RELATED SPECIFICATIONS

- A. Section 02470 – Drilled Caisson Piles.
- B. Section 02771 – Concrete Curbs, Headers and Sidewalks.
- C. Section 03100 – Concrete Forms and Accessories.
- D. Section 03200 – Concrete Reinforcement.
- E. Section 03330 – Architectural Cast-in-Place Concrete.
- F. Section 03350 – Concrete Finishes.
- G. Section 03411 – Precast Concrete Hollow Core Planks.
- H. Section 05120 – Structural Steel.

1.3 REFERENCES

- A. The work covered in this Section shall conform to the latest edition and latest addenda thereto of the following publications to the extent referenced. The publications are referred to in the text by the basic designation only.
 1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. AASHTO M182, Burlap Cloth Made from Jute or Kenaf.
 2. American Concrete Institute (ACI):
 - a. ACI 117, Tolerances for Concrete Construction and Materials.
 - b. ACI 121R, Quality Assurance Systems for Concrete Construction.
 - c. ACI 201.2R, Durable Concrete.
 - d. ACI 211.1, Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

- e. ACI 214, Evaluation of Strength Test Results of Concrete.
 - f. ACI 301, Structural Concrete.
 - g. ACI 303.1, Cast-in-Place Architectural Concrete.
 - h. ACI 304R, Measuring, Mixing, Transporting and Placing Concrete.
 - i. ACI 304.2R, Placing Concrete by Pumping Methods.
 - j. ACI 305R, Hot Weather Concreting.
 - k. ACI 306.1, Cold Weather Concreting.
 - l. ACI 308, Curing Concrete.
 - m. ACI 309R, Consolidation of Concrete.
 - n. ACI 311.1R, ACI Manual of Concrete Inspection.
 - o. ACI 315, Details and Detailing of Concrete Reinforcement.
 - p. ACI 318, Building Code Requirements for Structural Concrete and Commentary.
 - q. ACI 347R, Formwork for Concrete.
 - r. ACI SP-2, ACI Manual of Concrete Inspection.
 - s. ACI SP-15, Structural Concrete for Buildings.
3. American Society for Testing and Materials (ASTM):
- a. ASTM C31, Making and Curing Concrete Test Specimens in the Field.
 - b. ASTM C33, Concrete Aggregates.
 - c. ASTM C39, Compressive Strength of Cylindrical Concrete Specimens.
 - d. ASTM C42, Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - e. ASTM C94, Ready-Mixed Concrete.
 - f. ASTM C138, Standard Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete.
 - g. ASTM C143, Test Method for Slump of Hydraulic Cement Concrete.
 - h. ASTM C150, Portland Cement.
 - i. ASTM C156, Test Method for Water Retention by Concrete Curing Materials.
 - j. ASTM C171, Sheet Materials for Curing Concrete.
 - k. ASTM C172, Sampling Freshly Mixed Concrete.
 - l. ASTM C173, Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 - m. ASTM C227, Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).
 - n. ASTM C231, Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - o. ASTM C260, Air-Entraining Admixtures for Concrete.
 - p. ASTM C470, Molds for Forming Concrete Test Cylinders Vertically.
 - q. ASTM C494, Chemical Admixtures for Concrete.
 - r. ASTM C827, Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
 - s. ASTM C920, Elastomeric Joint Sealants.
 - t. ASTM C989, Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
 - u. ASTM C1017, Chemical Admixtures for Use in Producing Flowing Concrete.
 - v. ASTM C1077, Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
 - w. ASTM C1107, Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
 - x. ASTM C1116, Fiber-Reinforced Concrete.
 - y. ASTM C1260, Potential Alkali Reactivity of Aggregates (Mortar-Bar Method).

- z. ASTM D512, Chloride Ion in Water.
 - aa. ASTM D516, Sulfate Ion in Water.
 - bb. ASTM D1179, Fluoride Ion in Water.
 - cc. ASTM D1339, Sulfite Ion in Water.
 - dd. ASTM D1751, Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - ee. ASTM D1752, Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - ff. ASTM D1785, Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
 - gg. ASTM D3867, Nitrite-Nitrate in Water.
 - hh. ASTM E96, Test Method for Water Vapor Transmission of Materials in Sheet Form.
 - ii. ASTM E329, Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
4. International Code Council: International Building Code (IBC), 2009 Edition, for post-installed steel anchors in hardened concrete.
 5. City of New York:
 - a. New York City Building Code, Local Law No. 76/2008, latest edition including amendments and supplements.
 - b. New York City Board of Standards and Appeals, latest edition including amendments and supplements.
 6. Concrete Plant Manufacturer's Bureau (CPMB):
 - a. Concrete Plant Standards of the Plant Manufacturers Bureau.
 7. Concrete Reinforcing Steel Institute (CRSI):
 - a. CRSI Manual of Practice.
 8. Corps of Engineers Specifications (CRD):
 - a. CRD C572, Polyvinyl Chloride Waterstop.
 9. New York State Department of Transportation (NYSDOT):
 - a. NYSDOT Standard Specification - Construction and Materials.

1.4 DEFINITIONS

- A. Cast-in-Place Architectural Concrete: Formed concrete that is exposed to public view on the exterior façade of the building and all vertical concrete elements exposed to view on the exterior of the building, such as retaining walls and protection walls.
- B. Cementitious Material: As used herein, shall include Portland cement or white granulated blast furnace slag.

- C. Design Strength (f_c): The specified compressive strength of concrete to meet structural design criteria.
- D. Mixture Proportioning: A description of the proportions of a concrete mixture that are selected to enable it to meet the performance durability requirements, workability, specified compressive strength, and constructability requirements.
- E. Mixture Proportions: The concrete supplier's by-mass proportions to replicate the mixture design.
- F. Field Test Strength (f_{cr}): The required compressive strength of concrete to meet structural and durability criteria. Determine (f_{cr}) during mixture proportioning process.
- G. Normal Weight Concrete: Concrete for which density is not a controlling attribute, produced with aggregates stipulated under ASTM C33, and having a unit weight in the range of 135 to 160 lbs. per cubic foot.
- H. Exposed Finish: A general use finish applicable to all formed concrete exposed to public view on the exterior façade of the building and all vertical concrete elements exposed to view on the exterior of the building.
- I. Unexposed Finish: A general use finish, with no appearance criteria, applicable to all formed concrete concealed from public view after completion of construction.
- J. Inspection Requirements: The inspection requirements of the New York City Building Code, Local Law 76/2008 as defined in Section 1704.4 for Concrete Construction shall apply to all applicable concrete materials and construction specified in this Section.

1.5 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Concrete Mixture Designs: Applicable to normal weight cast-in-place concrete for use in the building, foundations and site structures unless specified otherwise.
 - 1. Proportion trial mixtures, including the molding and curing of test specimens, or assemble field test data as appropriate, for each class of concrete. Proportion normal weight concrete in accordance with the recommendations of ACI 211.1.
 - 2. Establish the required average strength, (f_{cr}), of the mixture design on the basis of trial mixtures or documented field test data for each mixture design and proportion concrete mixtures accordingly as specified in ACI 301.
 - a. The Contractor shall employ an independent and experienced testing laboratory acceptable to the Commissioner to prepare the proposed mixture design and required computations from the results of the test specimens in accordance with the provisions of ACI 301. This laboratory shall be responsible for all concrete mixture design and trial batch testing.
 - b. Testing laboratory shall have been inspected within the last 2-1/2 years by the Cement and Concrete Reference Laboratory (CCRL) of the National Institute of Standards and Technology for testing concrete aggregates and for the preparation and testing of concrete trial batches with or without admixtures. The laboratory shall provide documentation indicating how any deficiencies in the latest CCRL inspection report have been corrected.

- c. Prior to approval, all testing of proposed materials and mixture designs including trial batch and shrinkage testing shall be at the Contractor's expense.
- 3. Base the concrete design on the materials to be used in the work. If the specified requirements cannot be met, furnish other acceptable materials and/or make necessary changes in the mixing procedure to meet the specified requirements.
- 4. Design and proportion concrete mixtures to provide an average 28-day compressive strength in excess of the specified 28-day design compressive strength so that the minimum ultimate compressive strength required for each strength class will be obtained.
- 5. The determination of the concrete mixture proportion to attain the required strength shall be in accordance with the provisions of the New York City Building Code, Local Law 76/2008 unless otherwise specified.
 - a. Proportioning on the basis of field experience and/or trial mixtures shall be in accordance with section 1905.3 of the New York City Building Code, Local Law 76/2008. Where proportioning on the basis of field experience is used a mixture design employing the same ingredients proposed for use, and used successfully on a previous project, or projects, may be used provided the following are submitted by a licensed concrete testing laboratory and approved by the City of New York.
 - (1) The name and location of the plant from which the concrete will be batched.
 - (2) The concrete mixture design including detailed data and analysis of the ingredients proposed for use as specified herein.
 - (3) Reports for at least 50 consecutive tests of 7-day and 28-day concrete strength tests of the proposed mixture made during the previous twelve months of concrete batched and delivered from the same plant that is to furnish this job. These data shall include an evaluation in accordance with ACI 214 to determine the average strengths, moving averages and the coefficients of variation. In addition, the results of a minimum of 3 shrinkage tests for this mixture made during the previous twelve months and using the same materials to be used on this project.
 - (4) Reports of compliance tests of fine and coarse aggregates made during the above tests.
 - b. For those portions of the work where the Rules, Regulatory or Standard Specifications of agencies other than the Building Services Department govern, the concrete shall be proportioned in accordance with the applicable Code, Rules Regulations or Standards. Concrete shall be proportioned at a slump not to exceed 4 inches.
- 6. The concrete design mixture shall meet or exceed each specified property or requirement. Where more than one criterion is specified, conform to the most stringent. For example, a minimum cementitious content or maximum water-cementitious ratio may result in compressive strengths greater than the minimum specified. Likewise, a greater cement content or lower water-cementitious materials ratio may be required to achieve the required compressive strength.
- 7. Form TR-3: Technical Report Concrete Design Mix: The Contractor shall be responsible for, and bear all costs associated with, the filing and securing of approvals, if any, for Form TR-3: 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 the concrete design mix, testing, signatures and professional seals, etc.,

compliant with NYC Department of Buildings requirements, for each concrete design mix.

8. At the start of construction, mix a full-sized batch, using the accepted materials, the type of mixer and the mixing procedure planned for the project to verify the adequacy of the selected proportions to produce concrete with the required total air content and consistency, and with workability compatible with the intended placing method. This batch will provide the basis for final adjustment of the accepted design.
9. Adjustment to Concrete Mixtures: Design mixture adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Submit laboratory test data for revised mix design for the Commissioner's approval prior to using the revised mix design in the work. Mixture design adjustments shall be at the sole expense of the Contractor.
10. The requirement for a trial batch may be waived if the required test information has been provided in a previous laboratory trial batch run on the identical mixture design within the previous two years. The same brand, type, and source of all materials shall have been used.

B. Measurements and Allowable Tolerances: Conform to requirements of cited References in Article 1.3 herein but provide more restrictive tolerances where required to meet job conditions.

1. Concrete work at exposed surface conditions, including slabs, beams, and walls shall not deviate more than 1/2 inch from theoretical design locations.
2. Variation from a 10-foot straightedge placed in all directions:
 - a. Horizontal and inclined surfaces: 1/8 inch.
 - b. Vertical surfaces: 1/4 inch.
 - c. Eliminate depressions on horizontal surfaces which could hold water.
3. Out-of-plumb piers, walls, and joints: 1/4 inch in 10 feet, not to exceed one inch total.
4. Level and grade of slab soffits, beam soffits, and arises: 1/4 inch in any 10 feet length; 3/8 inch in any 20 feet length; not to exceed 3/4 inch for entire surface.
5. Cross sectional dimensions of beams, and slabs: Plus 1/4 inch, minus 0.
6. Size and location of sleeves, floor openings, inserts and anchor bolts: 1/4 inch.
7. Difference between the diagonal dimensions of a rectangular opening: Not more than two percent of the sum of the diagonal dimensions.
8. Tolerances shall not be cumulative.

1.6 SUBMITTALS

- A. Submit the following information listed below in accordance with applicable Contract requirements.
- B. Qualifications Submittals
 1. Coordinate with applicable Contract requirements for Contractor Quality Control.
 2. Contractor's Surveyor: Submit qualifications of the Contractor's licensed Surveyor to adequately survey all sleeves for conduits, deck openings and anchor bolts for future work.
 3. Quality Assurance: Develop and submit for approval a quality control plan in accordance with the guidelines of ACI 121R and as specified herein. The plan shall include plans for

the concrete supplier, the reinforcing steel supplier, and installer. Maintain a copy of ACI SP-15 and CRSI Manual of Practice at the project site.

C. Quality Control Submittals

1. Concrete Design Mixes:

- a. Proposed concrete mix design method and test data for each class of concrete and for each proposed change of ingredients and ingredient sources, including admixtures, in accordance with the documentation provisions of ACI 301. Identify for each mix design submitted the method by which proportions have been selected.
- b. Mix proportions conforming to the requirements of the New York City Building Code, Local Law 76/2008, and this Section for water/cement ratio, cement content, slump, maximum size of coarse aggregate, air content, admixtures, and chloride concentration, as well as compressive strength.
- c. For concrete mixture designs based on trial mixtures, include laboratory trial mixture proportions, test results and graphical analysis, and indicate required average compressive strength, f'_c , developed at 7 and 28 days from not less than 3 test cylinders cast for each test and for each mixture design. Indicate quantity of each ingredient per cubic yard of concrete. Indicate type and quantity of admixtures proposed or required. Indicate aggregate gradation for fine and coarse aggregates.
- d. Submit for approval new historical field strength test data, data from new trial mixtures or evidence which indicates that the change will not adversely affect the relevant properties of the concrete prior to changing the brand, type, size or source of cementitious materials, aggregates, water, ice or admixtures.

2. Test Reports:

- a. Submit following information for review:
 - 1) Types, classes, procedures, names and plant locations for cementitious materials.
 - 2) Types, pit or quarry locations, producer's names, gradations and properties required by ASTM C33 for aggregates for the building structure and site structures.
 - 3) Types, brand names, producer's names for admixtures; and source of supply for water and ice.
- b. Except for admixtures and water, test results not more than 90 days old confirming the conformance of all concrete materials with applicable specifications.
- c. Cement: Submit test results in accordance with ASTM C150 Portland Cement. Submit current mill data.
- d. White Granulated Blast Furnace Slag: Submit test results in accordance with ASTM C989 for white iron blast furnace slag. Submit test results performed within 6 months of submittal date.
- e. Aggregates: Submit test results for aggregate quality for normal weight concrete in accordance with ASTM C33, the combined gradation curve for grading proposed for use in the work and used in the mixture qualification, and ASTM C295 for results of petrographic examination. Where there is potential for alkali-silica reaction, provide results of tests conducted in accordance with ASTM C227

or ASTM C1260. Submit results of all tests during progress of the work in tabular and graphical form as noted above, describing the cumulative combined aggregate grading and the percent of the combined aggregate retained on each sieve.

- f. Admixtures: Submit test results in accordance with ASTM C494 and ASTM C1017 for concrete admixtures, ASTM C260 for air-entraining agent, manufacturer's literature and test reports for crystalline waterproofing admixture. Submitted data shall be based upon tests performed within 6 months of submittal.
- g. Submit samples of materials as requested by the Commissioner including name, source and description of each type of aggregate.
- h. Submit copies of laboratory test reports for concrete materials and mixture design tests. The Commissioner's review will be for information only. Production of concrete to comply with the specified requirements shall be the responsibility of the Contractor.
- i. A complete record of the date and details of each concrete placement including the exact location thereof and the date of removal of forms. This record shall be coordinated with and in addition to that maintained by the Commissioner.

3. Certifications:

- a. Materials, equipment and aggregates approved by the Materials Bureau of the New York State Department of Transportation (NYSDOT), in the NYSDOT publications listed below, are acceptable for use without a detailed submission for review and approval. However, submittal is required to establish the particular material, equipment or aggregate source to be used with approval identification number, and/or page number.
 - 1) M.A.P. Code 7.42-3.1 - Approved Materials and Equipment for use on NYSDOT Projects.
 - 2) M.A.P. Code 7.42-3.2 - Approved Sources of Fine and Coarse Aggregates.
- b. All materials used in the manufacture of concrete shall be accompanied by a certificate from the manufacturer or supplier indicating test results of current production stockpiles or shipments.
- c. Certifications by the concrete supplier that all concrete ingredients conform to the specified requirements in accordance with ASTM C94. Be advised that the proposed concrete supplier is subject to the City of New York's approval based on experience and past performance on similar projects.
- d. Certifications by the concrete supplier of conformance of mixture designs.
- e. Manufacturer's certification that chloride content of each concrete admixture complies with specified requirements.
- f. Affidavits from an independent testing laboratory certifying that all materials furnished under this Section conform to specified requirements.

4. Material and Product Data:

- a. Submit samples of materials as specified and as otherwise may be requested by the Commissioner, including names, sources, and descriptions.
- b. Submit manufacturer's technical data and installation instructions for manufactured materials and products.
- c. Furnish manufacturer's certifications and laboratory test reports as requested by the Commissioner.

- d. Submit notarized certification of conformance to referenced standards when requested by the Commissioner.
5. Form removal schedule: Submit schedule for form removal indicating element and minimum length of time for form removal. Submit technical literature of forming material or liner, form release agent, form ties, and gasketing to prevent leakage at form and construction joints. Provide a full description of materials and methods to be used to patch form-tie holes.
6. Shop Drawings and Construction Procedures:
- a. Proposed concrete placement schedule and shop drawings prior to start of concrete placement operations, including location of all construction, expansion and control joints.
 - b. Proposed equipment and method(s) of concrete pumping and conveying.
 - c. Proposed equipment and method(s) of concrete placement, vibration and compaction.
 - d. Proposed method(s) of concrete curing.
 - e. Methods for cold and hot weather mixing, placement, curing and planned protective measures.
 - f. Complete information pertinent to a concrete plant to be erected at the site as required by the CPMB Publication "Concrete Plant Standards of the Plant Manufacturers Bureau."
 - g. Proposed special procedures for protection of concrete under wet weather placement conditions.
 - h. Proposed method of measuring concrete surface temperature changes.
 - i. Detailed procedures for removing stains, rust, efflorescence, and surface deposits.
 - j. The following information, if ready-mixed concrete is used:
 - 1) Identification of Ready-Mixed Concrete Supplier including the plant location and all pertinent information required by the CPMB Publication "Concrete Plant Standards of the Plant Manufacturers Bureau."
 - 2) Locations of sources of materials for cement, fine and coarse aggregates, and water, and the brands and types of admixtures to be used.
 - 3) Physical capacity of mixing plant.
 - 4) Trucking facilities available.
 - 5) Estimated average amount which can be produced and delivered to the site during a normal 8-hour day, excluding the output to other customers.
 - 6) Estimated travel time to the site.
7. Delivery Tickets:
- a. Furnish the Commissioner with a copy of the delivery ticket for each load of concrete delivered to the site. Delivery tickets shall contain all information specified in Section 16.1 of ASTM C94.
 - b. Provide batch tickets for each batch of job-site mixed concrete as specified.

1.7 QUALITY ASSURANCE

- A. All work shall comply with the provisions of the New York City Building Code, Local Law 76/2008, and the rules of the Board of Standards and Appeals, latest edition of each and

amendments or supplements thereto. Work of this Section shall conform to all applicable Federal, State and local laws and regulations.

B. Pre-installation Conference: Conduct conference at project site to comply with following requirements.

1. Before submitting concrete design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place structural and architectural concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixes.
 - c. Ready-mix concrete manufacturer.
 - d. Cast-in-place architectural concrete subcontractor.
2. Review concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction joints, forms and form-removal limitations, reinforcement accessory installation, concrete repair procedures, and protection of cast-in-place architectural concrete.

C. Inspection and Testing:

1. All structural concrete work, including concrete materials and construction operations, shall be subject to special inspection and testing in accordance with the requirements of the New York City Building Code, Local Law 76/2008, and applicable Contract provisions.
2. Special inspection and testing services required by the New York City Building Code, Local Law 76/2008, will be provided by the Special Inspector. Construction inspection and testing of work not regulated under special inspection but covered under this Section will be performed under the direction of the Commissioner.
3. Special Inspections
 - a. 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 New York City Construction Codes shall 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 2008 New York City Construction Codes requirements or as additionally may be called for in the Specifications. The Special Inspector shall be an entity compliant with the requirements of the 2008 New York City Construction Codes.
 - b. The Contractor shall notify the relevant Special Inspector in writing at least 72 hours before the commencement of any work requiring Special Inspection. The Contractor shall be responsible for, and bear related costs, to assure that all construction or work shall remain accessible and exposed for inspection purposes until the required inspection is completed.
 - c. Inspections and tests performed under Special Inspections shall 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.

- 1) Failure of a special inspection or test to detect a defect in materials or workmanship shall not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 - 2) Failure to detect defective work or material shall not in any way prevent rejection should a defect be discovered at a later date nor shall it obligate the Commissioner for final acceptance.
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4. Concrete materials, mixing and placement procedures are subject to special inspection and tests in the plant and field by the Special Inspector. Concrete materials and operations will be inspected and tested by the Special Inspector as the work progresses.
 5. Plant inspections may be made by the Special Inspector at its discretion. Provide at least 72 hours written notice to the Special Inspector prior to the beginning of any concrete materials or mixing work so that inspection may be provided. Furnish all facilities for the inspection of materials and workmanship in the plant, and allow the inspectors free access to the necessary parts of the work.
 - a. Special Inspectors shall have the authority to reject any material or work that does not meet the requirements of this Section.
 - b. Inspection at the plant is intended as a means of facilitating the work and avoiding errors, but it is expressly understood that it will in no way relieve the Contractor from the responsibility for furnishing proper materials or workmanship specified herein.
 6. Concrete materials and installed work may require testing and retesting, as directed by the Commissioner, at any time during the progress of the work. Allow free access to material stockpiles and facilities at all times. Bear the cost of tests not specifically indicated to be performed as special inspection by the Commissioner, including the retesting of rejected materials and installed work.
 7. Other quality control inspection and testing services required by the Contractor to ensure compliance with the Contract Documents for cast-in-place concrete shall be provided by an approved independent inspection and testing agency engaged by and supervised by the Contractor at no additional cost to the City of New York.
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- D. Source Limitations for Cast-in-Place Architectural Concrete: Each concrete material shall be the product of a single plant and raw material source throughout the project. Architectural concrete plant shall have the resources necessary to provide cast-in-place architectural concrete of consistent quality in appearance and physical properties.
- E. Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- F. Comply with ACI 301, except as modified herein.
- G. Do not commence furnishing or placement of concrete until concrete mixture designs have been reviewed and approved by the Commissioner.
- H. Closely coordinate the work of this Section with other trades whose work affects, or is affected by, the work of this Section.
- I. Work in Connection with Other Sections and Trades:

1. Provide all sleeves, inserts, anchors and embedded items required for adjoining work or for its support prior to concreting. No concrete shall be deposited until the Commissioner has inspected the placement of the embedded items and the reinforcing bars and has given permission to place the concrete.
2. Provide ample notice and opportunity to the other trades, whose work is related to cast-in-place concrete or must be supported by it, to introduce and furnish embedded items before the concrete is placed.
3. Install pipes, ductwork, electrical conduits, junction boxes and similar items prior to concreting in accordance with all requirements of the New York City Building Code, Local Law 76/2008. Protect such installations to the extent that they are not displaced or damaged during the concrete placement.
4. Provide openings in slabs for pipes, conduits and the like required for the work of other trades where indicated on the Contract Drawings or Shop Drawings. When work is completed, close up the excess part of the respective openings completely to the pipe sleeve and inserts to match the adjoining work.
5. Provide and set true and to proper alignment in the concrete all sleeves for miscellaneous metal work, castings, pipes and anchors (including attachments for glazed curtain wall assemblies) as indicated on the Contract Drawings, approved Shop Drawings for other trades or required by the manufacturer's templates.
6. Temporarily fill voids in embedments with readily removable material to prevent entry of concrete into the void.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Cement shall be stored in weather-tight buildings, bins or silos which will provide protection from dampness and contamination and will minimize warehouse set.
- B. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation or contamination with other materials or with any other sizes of like aggregates. To insure that this condition is met, any test for determining conformance to requirements for cleanliness and grading shall be performed on samples secured from the aggregates at the point of batching. Frozen or partially frozen particles shall not be used.
- C. Stockpiles of natural or manufactured sand shall be allowed to drain freely to minimize variations in moisture content throughout the stockpile.
- D. Admixtures shall be stored in such a manner as to avoid contamination, evaporation or damage. For those used in the form of suspensions or non-stable solutions, suitable agitating equipment shall be provided to assure uniform distribution of the ingredients. Liquid admixtures shall be protected from freezing and other temperature changes that would adversely affect their characteristics. All admixture containers shall be clearly marked with paint as to their content and dosage.
- E. Do not deliver concrete until forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement.

1.9 PROJECT CONDITIONS

- A. Field Measurements

1. Prior to commencement of the work, field verify existing dimensions, elevations, locations and conditions applicable to the work. Report variances and discrepancies from the Contract Drawings and potential interferences promptly to the Commissioner.
2. Take sufficient field measurements prior to preparation of Shop Drawings and fabrication of construction materials, where possible, to ensure proper fitting of the work. However, do not delay job progress. Allow for adjustments and fitting wherever the taking of field measurements before fabrication may not be possible or might delay the work.
3. Actual field-verified conditions may require modifications to the construction details indicated on the Contract Drawings. Perform the work to meet actual field conditions encountered. Submit a record of variances and discrepancies on drawings to the Commissioner to document actual field-verified conditions.

PART 2 - PRODUCTS

2.1 CONCRETE QUALITY AND PROPORTIONING

- A. Select concrete proportions to produce the required design strength and to provide durability against deterioration and abrasion, watertightness, workability and mixture consistency to facilitate concrete placement, compaction into the forms and around reinforcement without segregation or excessive bleeding, and to achieve the desired finished appearance.
- B. Durability and Strength: Conform to the applicable requirements of ACI 201.2R and ACI 211.1. Adjust the concrete 28-day design compressive strength to produce cast-in-place concrete of minimum design compressive strength (f'_c) as follows:

Item	Concrete Class	28-day Minimum Design Strength (f'_c)
Concrete Curbs, Headers and Sidewalks	Class 30	3,000 psi
Cast-in-Place Structural Concrete	Class 50	5,000 psi
Cast-in-Place Architectural Concrete	Class 50	5,000 psi
Cast-in-Place Concrete Topping Overlay	Class 50	5,000 psi
Concrete Fill for 13-in. Diameter Caisson Piles	Class 70	7,000 psi
Precast Concrete Hollow Core Planks	Class 60	6,000 psi

- C. Strength and Water-Cementitious Materials Ratio:
 1. Strength requirements shall be based on 28-day compressive strength determined by testing 6-inch by 12-inch cylindrical specimens in accordance with ASTM C39. The specified compressive strength of the concrete (f'_c) for each portion of the structure shall meet the requirements in the Contract Documents.
 2. Produce cast-in-place concrete with a maximum water-cementitious materials ratio of 0.40 for normal weight concrete by weight of the total cementitious constituent. In computing the water-cementitious materials ratio, water content shall include free surface moisture contained in the aggregate and water content of all liquid admixtures.
 3. The amount of portland cement shall be between 50 percent and 60 percent of the total mass of cementitious material. White granulated blast-furnace slag conforming to ASTM C989 shall not be less than 40 percent by weight of the total mass of cementitious material. The total mass of cementitious material shall be not less than 600 pounds per cubic yard of concrete.

4. Fly ash or pozzolan conforming to ASTM C618 Type F shall not be permitted in architectural cast-in-place concrete.

D. Consistency: Proportion the concrete mixture to achieve, at the point of deposit, a maximum slump of 4 inches (without addition of water-reducing admixtures) as determined by ASTM C143, unless indicated otherwise. Where an ASTM C494, Type F or G admixture is used, the slump after the addition of the admixture shall be not greater than 8 inches. Slump tolerances shall comply with the requirements of ACI 117. Maintain slump at lowest value consistent with the ability to satisfactorily place, consolidate and finish concrete.

E. Air Content: Air entrain all normal weight concrete. Total air content shall be 5.0 percent by volume in the plastic state within a tolerance of 1.5 percent, as determined by ASTM C173 or C231, except as noted below.

1. For concrete topping overlay surfaces that will receive a hard steel troweled or magnesium troweled finish, including the addition of a surface hardener, as specified in Section 03350 - Concrete Finishes, the maximum total air content shall be 3.0 percent.

F. Required Average Strength of Concrete: The minimum compressive strength (f'_c) of the selected mixture shall equal or exceed the strength required under ACI 301 for laboratory mixture designs. The average compressive strength produced under field tests shall be the minimum compressive strength (f'_c) required during construction.

2.2 MATERIALS

A. General: Provide materials that meet the minimum requirements specified herein. Materials are applicable to cast-in-place structural concrete for use in buildings and site structures unless specified otherwise.

B. Portland Cement: ASTM C150, Type I. Portland cement for architectural concrete shall be in accordance with the requirements of Section 03330. Use one manufacturer for each type of portland cement or ground slag.

1. Type III (high early strength) may be used for cast-in-place concrete placed during cold weather with permission of the Commissioner or as required for precast concrete construction. Air entraining cement is not permitted.
2. Use portland cement made by a well known acceptable manufacturer and produced by not more than one plant.
3. Do not use cement which has deteriorated because of improper storage or handling.

C. White Granulated Blast Furnace Slag:

1. White granulated blast furnace slag mineral admixture shall meet the requirements of ASTM C989, Grade 120 or better. White granulated blast furnace shall meet the requirements of "NewCem" manufactured by Lafarge Cement Co. or approved equal.
2. Laboratory trial batches will be tested to determine compliance with strength requirements, times of setting, slump, slump loss, and shrinkage characteristics.

D. Fly Ash or Pozzolan: Fly ash or pozzolan mineral admixture shall not be permitted in cast-in-place architectural concrete.

E. Aggregates:

1. Fine and coarse aggregates for architectural concrete shall be in accordance with the requirements of Section 03330.
2. Fine and coarse aggregates shall meet the requirements of ASTM C33 with the requirements of Table 3, Class 4S. Soundness shall be tested using magnesium sulfate. Abrasion resistance shall be tested using the Los Angeles Abrasion Test. For testing requirements, concrete shall be assumed to be subject to abrasion.
3. Where historical data is used, provide aggregates from the same sources having the same size ranges as those used in the concrete represented by historical data.
4. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed concrete surfaces. Marine dredged aggregates shall not be used. Provide aggregates containing no deleterious material properties as identified by ASTM C295.
5. The loading, storing, unloading, and batching of aggregates shall be conducted in such a manner as to prevent segregation, intermingling, or the inclusion of foreign materials. All aggregates shall remain in free drainage storage until a stable moisture content is attained prior to placement in the batching plant bins. Each size of coarse aggregate and the fine aggregate shall be kept in separate hoppers or bins. All aggregates shall be delivered to the batching plant bins by a belt conveyor or other approved means; and the operation thereof shall be controlled so as to prevent the mixing of the sizes and kinds of aggregates with each other. Any mixture of fine and coarse aggregates or of the two sizes of coarse aggregate in the batching plant bins or prior thereto shall be cause for rejection of such materials, and the affected bin or bins shall be emptied and inspected prior to refilling with the correctly graded aggregate.
6. Provide aggregates for exposed concrete from one source in accordance with ASTM C227. Do not provide aggregates that react deleteriously with alkalis in cement.
7. If ASTM C1260 considers aggregate to be potentially reactive with alkalis in the cement, mixture design shall be tested as described herein.
8. Fine aggregates for normal weight concrete:
 - a. ASTM C33 including restrictions on reactive materials except that loss when tested for soundness using magnesium sulfate shall not exceed 12 percent.
 - b. Fine aggregate shall be composed of clean, sharp, hard, strong, durable, insoluble, uncoated, natural sand free from loam, clay lumps or other deleterious substances.
 - c. Particles finer than a 50 screen shall be light gray or tan in color in accordance with Section 03330.
 - d. Dune sand, bank run sand and manufactured sand are not acceptable.
 - e. Sand having FM less than 2.40 or greater than 3.00 will not be allowed.
9. Coarse aggregate for normal weight concrete:
 - a. ASTM C33, Size No. 67, Class 4S, including restrictions on reactive materials except that loss when tested for soundness using magnesium sulfate shall not exceed 12 percent.
 - b. Coarse aggregate shall be crushed stone processed from natural rock or stone and shall consist of clean, hard, strong, durable, insoluble, unweathered, and uncoated pieces of uniform quality throughout; and shall be free from such alkali, decomposed minerals, organic material, clay, mica, schist, or other foreign matter that will render it unsuitable.

- c. Use of slag and pit or bank run gravel is not permitted, nor clay lumps in excess of 1.0 percent by weight of coarse aggregate.
- d. Coarse aggregate for architectural concrete shall be washed, hard, crushed gray quarry stone, maximum 3/4 inch in size.

F. Water: Clean, potable and free of substances that may be objectionable to concrete or steel. Water shall meet the requirements of ASTM C94 and the chloride and sulfate limits in accordance with ASTM D512 and ASTM D516. Mixing water shall not contain more than 500 parts per million of chlorides as Cl and not more than 100 parts per million of sulfates as SO₄. Water shall be free from injurious amounts of oils, acids, alkalis, salts, and organic materials.

G. Alkali-Silica Reaction

1. Concrete mixture containing aggregates considered potentially reactive by ASTM C1260 shall be considered acceptable if the expansion as measured by ASTM C1260 (modified) is not greater than 0.08 percent at 16 days. Mixture designs not meeting this requirement will be rejected.

H. Concrete Admixtures:

1. General: Provide approved chemical admixtures produced and serviced by established, reputable manufacturers that comply with the requirements shown below and in accordance with manufacturer's recommendations, and appropriate for the climatic conditions and the construction needs. Admixtures shall meet requirements of the reference standards or documented to have three-year minimum history of demonstrably satisfactory performance for similar structures under equivalent conditions. Admixtures shall be certified to be compatible with the cement, aggregates, and other constituent materials in the concrete mixture.
2. Calcium Chloride: Not permitted. Do not use calcium chloride or admixtures containing chlorides, thiocyanate, or more than 0.05 percent calcium chloride ions other than impurities from admixture ingredients.
3. Silica Fume: Not permitted.
4. The total alkali content shall not increase the total sodium-oxide equivalent alkali content of the concrete by more than 0.5 pounds per cubic yard.
5. Air-Entraining Admixture: Provide a reputable product conforming to requirements of ASTM C260, certified by manufacturer to be compatible with other selected admixtures.
6. Water-Reducing Admixture: Provide a reputable product conforming to requirements of ASTM C494 Type A.
7. Water-Reducing and Retarding Admixture: Provide a reputable product conforming to requirements of ASTM C494 Type D.
8. Water-Reducing and Accelerating Admixture: Provide a reputable product conforming to requirements of ASTM C494 Type E.
9. High Range Water-Reducing Admixture: Provide a reputable product conforming to requirements of ASTM C494 Type F or G for regular concrete or self-consolidating concrete.
 - a. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - 1) Glenium Series, BASF Corporation/Master Builders, Cleveland, OH.
 - 2) Eucon 37, Euclid Chemical Company, Cleveland, OH.

- 3) Plastol Series, Euclid Chemical Company, Cleveland, OH.
- 4) Sikament 686, Sika Corporation, Lyndhurst, NJ.
- 5) Or approved equal.

10. Viscosity Enhancing Admixtures:

- a. Self-Consolidating Concrete (SCC) for architectural concrete in building walls shall include viscosity enhancing materials be in accordance with the requirements of Section 03330.

11. Crystalline Waterproofing Admixture:

- a. For all Class 50 concrete, provide crystalline waterproofing admixture comprised of Portland cement, very fine treated silica sand and various proprietary chemicals that creates a non-soluble crystalline formation throughout the pores of the concrete, sealing the concrete from water penetration and providing self-healing of hairline cracks up to 0.4 mm wide.
- b. Dosage: In accordance with product manufacturer's guidelines but not less than 2% by weight of cementitious materials. Account for the percentage by weight of cementitious materials represented by the admixture in computing the water-cementitious materials ratio of the overall mixture.
- c. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - 1) Rheomac 300D, BASF Corporation, Cleveland, OH.
 - 2) C-500 (C-1000, C-200), Xypex Corporation, Richmond, BC, Canada.
 - 3) Krystol Internal Membrane (KIM, K-300, K-301), Krystol International, Vancouver, BC, Canada.
 - 4) Or approved equal.

2.3 EPOXY BONDING AGENT

- A. Provide a two-component epoxy resin bonding agent conforming to ASTM C881. Provide Type I for bonding hardened concrete to hardened concrete; Type II for bonding freshly mixed concrete to hardened concrete; and Type III as a binder in epoxy mortar or concrete, or for use in bonding skid-resistant materials to hardened concrete. Provide Grade 1 or 2 for horizontal surfaces and Grade 3 for vertical surfaces. Provide Class A if placement temperature is below 40°F; Class B if placement temperature is between 40°F and 60°F; or Class C if placement temperature is above 60°F.
- B. VOC Limit: Provide epoxy bonding agent with maximum VOC content of 50 grams per liter.
- C. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 1. Sikadur 32, Hi Mod LPL; Sika Corporation, Lyndhurst, NJ
 2. Eucopoly LPL; Euclid Chemical Company, Cleveland, OH
 3. NC Adhesive Gel; BASF Building Systems, Shakopee, MN.
 4. Or approved equal.

2.4 CURING AND PROTECTION MATERIALS

- A. Provide curing materials that will not stain or affect concrete finish or lessen the concrete strength and comply with the following requirements:
1. Pervious Sheeting: Use materials conforming to AASHTO M182, Class 3; burlap cloth made from jute or kenaf, weighing approximately 10 ounces per square yard.
 2. Curing mats shall be heavy carpets or cotton mats, quilted at 4 inches on center. Curing mats shall weigh a minimum of 12 ounces per square yard when dry.
 3. Impervious Sheeting: Use materials conforming to ASTM C171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap.
 4. Insulation Blankets:
 - a. Closed cell flexible foam sheet material such as polystyrene or urethane. Provide foam sheet material which is capable of being bent 90° without breaking or tearing at corners. The foam insulation blankets shall be minimum 1/2-inch thick.
 - b. Quilted, flexible insulation blankets that retain their insulating value when wet and which retard the evaporation of water.
 - c. Thermal resistance value (R-value) of 4 HR-SQ-FT-Degree F/BTU is required for protection of newly placed concrete.

2.5 PREFORMED COMPRESSIBLE JOINT FILLER

- A. Use a preformed compressible joint filler composed of closed-cell polyethylene foam or closed-cell synthetic foam of isomeric polymers at expansion joints in cast-in-place concrete work as indicated on the Contract Drawings. Provide compressible joint filler that meets the requirements of ASTM D1751 or ASTM 1752, Sections 5.1 through 5.4, except that the compression requirement shall not be less than 10 psi and not greater than 25 psi to compress the test specimen to 50 percent of its thickness.
- B. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
1. Sealtight Ceramar; W.R. Meadows, Inc., Hampshire, IL.
 2. Expansion-Joint Filler; BASF Building Systems, Shakopee, MN.
 3. Flexible Foam Expansion Joint filler; MASCO, Portland, OR.
 4. Or approved equal.

2.6 JOINT SEALANT AND BACKER ROD

- A. Use a moisture-cured, single-component, polyurethane base, non-sag, gun-grade elastomeric sealant compound at new expansion joints and control joints in cast-in-place concrete work as indicated on the Contract Drawings. Provide joint sealant that meets the requirements of ASTM C920, Type S, Grade NS, Class 25 and Use T or NT as applicable. Provide a backer rod that is closed-cell polyethylene foam rod, non-gassing with a diameter as recommended by the manufacturer for the joint width indicated. Use a backer rod that is compatible with the joint sealant and acceptable to the joint sealant manufacturer.
- B. VOC Limit: Provide joint sealant with maximum VOC content of 250 grams per liter.

- C. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:

1. Sikaflex 1-a; Sika Corporation, Lyndhurst, NJ.
2. Eucolastic I; Euclid Chemical Company, Cleveland, OH.
3. Sonolastic SL-1; BASF Building Systems, Shakopee, MN.
4. Or approved equal.

2.7 CONSTRUCTION JOINT FILLER

- A. Provide a two-component, self-leveling, elastic type, modified epoxy or polyurea joint filler for filling and sealing narrow grooves in horizontal construction and control joints. Joint sealer shall be suitable to protect concrete joint edges in heavy duty, industrial concrete floors and wearing surfaces subject to abrasion, heavy traffic and concentrated loads. Suitable for applications where anticipated joint movement will not exceed 10 percent of opening width. Provide joint filler capable of 100 percent elongation with a minimum tensile strength of 325 psi, a Shore A hardness between 75 and 95 and minimum adhesion strength to concrete of 200 psi.

- B. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:

1. Groove and Crack Filler #250; Anti-Hydro International, Inc., Flemington, NJ.
2. TF-100 Control Joint Filler, BASF Building Systems, Shakopee, MN.
3. QWIKjoint 300; Euclid Chemical Company, Cleveland, OH.
4. Or approved equal.

2.8 EPOXY RESIN FOR GROUTING DOWELS

A. Vertical Dowels

1. Provide a two-component, 100-percent solids, moisture-tolerant, high-modulus epoxy resin specifically intended for grouting vertical dowels.
2. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. HIT-RE 500-SD; HILTI Inc., Tulsa, OK.
 - b. Sikadur 32, Hi-Mod; Sika Corporation, Lyndhurst, NJ.
 - c. E³-F High Flow Epoxy Grout System; Euclid Chemical Company, Cleveland, OH.
 - d. Masterflow MP, BASF Building Systems, Shakopee, MN.
 - e. Or approved equal.

B. Horizontal Dowels

1. Provide a two-component, 100-percent solids, moisture-tolerant, high-modulus epoxy resin specifically intended for grouting horizontal dowels.
2. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. HIT-RE 500-SD; HILTI Inc., Tulsa, OK.
 - b. Sikadur 31, Hi-Mod Gel; Sika Corporation, Lyndhurst, NJ.
 - c. Duralcrete Gel Epoxy System; Euclid Chemical Company, Cleveland, OH.

- d. Or approved equal.

2.9 POST-INSTALLED ANCHORS

A. Chemical Adhesive Anchor System:

1. Externally-Threaded Anchor: Provide post-installed externally-threaded anchors, compliant with 2009 International Building Code, consisting of a stud-type, all-thread anchor rod, nut and washer, manufactured from AISI 304 stainless steel.
2. Internally-Threaded Anchor: Provide post-installed internally-threaded anchors, compliant with 2009 International Building Code, manufactured from AISI 304 stainless steel.
3. Chemical Adhesive:
 - a. Provide chemical adhesive anchors, compliant with 2009 International Building Code, consisting of a two-part vinyl ester or structural epoxy resin adhesive and an amine-based hardener.
 - b. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - 1) HIT-RE 500-SD, Hilti, Inc., Tulsa, OK.
 - 2) Epcon G5 Adhesive Anchoring System, ITW Red Head, Addison, IL.
 - 3) PE100+, Powers Fasteners, Brewster, NY.
 - 4) Or approved equal.

B. Mechanical Expansion Anchors:

1. Provide wedge-type mechanical expansion anchors, compliant with 2009 International Building Code, manufactured from AISI 304 stainless steel meeting the requirements of Fed. Spec. A-A-1923 (formerly FF-S-325, Group II). Anchor may be headed, threaded or countersunk depending on intended use.
2. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. HDA-P Undercut Anchor, Hilti, Inc., Tulsa, OK.
 - b. TruBolt Wedge Anchors, ITW Red Head, Addison, IL.
 - c. Strong Bolt, Simpson-Strong Tie Anchor Systems, Columbus, OH.
 - d. Or approved equal.

2.10 NON-SHRINK GROUT

- A. General Use: Provide a non-shrink, non-metallic, ready-mix high strength, structural grout conforming to the requirements of ASTM C1107, Grade A, B or C depending on formulation and application, where indicated on the Contract Drawings. Non-shrink-grout shall show positive expansion when tested in accordance with ASTM C827. General uses of non-shrink grout shall include, but not be limited to, equipment bases, anchor rods and bolts, and bearing plates.
- B. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 1. SikaGrout 212; Sika Corporation, Lyndhurst, NJ.

2. Masterflow 713 Plus; MBT Protection and Repair Division of BASF Building Systems, Shakopee, MN.
3. NS Grout; Euclid Chemical Company, Cleveland, OH.
4. Or approved equal.

C. For grout materials and grouting of 13-inch diameter caisson piles, see Section 02470.

2.11 PVC WATERSTOPS

- A. Provide an extruded, ribbed-type virgin polyvinyl chloride (PVC) waterstop where indicated on the Contract Drawings that conforms to the requirements of CRD C572. Waterstops shall be extruded from high-quality PVC resins that are plasticized and stabilized to offer long-life performance, resistance to abrasion and attack by ozone, oxygen, alkalies and waterborne chemicals. Provide waterstops that have a shore A durometer between 65 and 75, tensile strength not less than 1,850 psi and specific gravity not more than 1.38. No reclaimed PVC materials shall be used in the manufacture of the waterstops.
- B. PVC waterstops for construction joints shall be the flat ribbed type, 6 inches wide, with a minimum thickness of 3/8 inch adjacent to the hollow center bulb.
- C. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 1. Model 732 for construction joints; Greenstreak, St. Louis, MO.
 2. Sealtight Model 6380 for construction joints; W.R. Meadows, Hampshire, IL.
 3. Ribbed Type 5 with Centerbulb; Durajoint Concrete Accessories, Garrettsville, OH.
 4. Or approved equal.

2.12 FIBER REINFORCEMENT

- A. Synthetic Macro-Fiber Reinforcement for Concrete Topping Overlay: Polyolefin macro-fibers engineered and designed for use in concrete, complying with ASTM C1116, Type III.
- B. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 1. Tuf-Strand SF; Euclid Chemical Company.
 2. Sika Fiber MS 20; Sika Corporation
 3. Strux 90/40; Grace Construction Products, W.R. Grace & Co.
 4. Or approved equal.

2.13 MISCELLANEOUS MATERIALS

- A. Sleeves for conduits and pipes: PVC Schedule 40 conforming to provisions of ASTM D1785.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- B. For foundations, grade beams and slabs-on-grade, verify that subbase materials are properly compacted and in acceptable condition upon which to construct cast-in-place concrete.
- C. Verify that vapor barrier has been installed where indicated on the Contract Drawings.
- D. Verify that formwork is properly constructed in conformance with Section 03100 - Concrete Forms and Accessories.
- E. Verify that reinforcement, supports, anchors, inserts, sleeves and other embedded items are accurately placed in conformance with Section 03200 - Concrete Reinforcement, are secured in position and will not interfere with proper placement of concrete.
- F. Verify that requirements for concrete cover to reinforcement are satisfied.
- G. Verify that anchor bolts are located as shown on approved anchor bolt layout drawings and are set accurately to templates and protected from damage.
- H. Provide ample notice and opportunity to other trades, whose work is related to the concrete or must be supported by it, to introduce and furnish embedded items before the concrete is placed.
- I. Coordinate through the Commissioner and provide sufficient clearance between reinforcement for drilled-in adhesive anchors for railings, miscellaneous structures, equipment, devices and those likely to be installed by other trades.

3.2 JOINT CONSTRUCTION

A. Construction Joints

- 1. Do not install horizontal or vertical construction joints in the Salt Shed building walls except as shown on the Contract Drawings.
- 2. Horizontal and vertical construction joints for other concrete elements are shown on the Contract Drawings. If modifications to the predetermined locations of construction joints are desired, secure the Commissioner's approval of joint design and location prior to start of concrete placement.
- 3. Install construction joints with 2-inch deep keyways, and with waterstops where shown, in accordance with the details indicated on the Contract Drawings. Support joint forms adequately so as to rigidly maintain their positions during placement, vibration and hardening of concrete.
- 4. Continue reinforcement across and perpendicular to construction joints unless details specifically indicate otherwise. Do not locate lapped splice of reinforcement across construction joint.

5. Do not place new concrete adjacent to previously placed concrete at construction joint until at least seven days for building walls and 48 hours for other concrete has elapsed since the initial placement.

B. Waterstops

1. Install approved waterstops where indicated on the Contract Drawings.
2. Use continuous lengths without splices, except as otherwise indicated on the Contract Drawings.
3. Connect all adjoining waterstops, including vertical and horizontal runs, in such a manner as to provide a continuous water barrier in accordance with the manufacturer's recommendations and as indicated in the details shown on the Contract Drawings.
4. Splices:
 - a. Strength: Not less than that of the parent section.
 - b. Watertightness: Make equal to that of continuous material.
 - c. Polyvinyl Chloride: Heat seal adjacent surfaces in accordance with manufacturer's recommendations using a thermostatically controlled electric source of heat that provides sufficient heat to melt but not to char the material.

C. Control (Contraction) Joints

1. Install at locations shown or noted on the Contract Drawings.
2. Construct control (contraction) joints, formed as shown on the Contract Drawings. Form control (contraction) joint by means of a wood strip, plastic strip, metal plate, or other approved material to be subsequently removed.
3. Provide 1/2-inch by 1/2-inch preformed recess at top of control (contraction) joint where indicated on the Contract Drawings and fill with joint sealant in accordance with sealant manufacturer's instructions.
4. Do not extend reinforcing steel or other embedded metal items through expansion joints except where indicated otherwise on the Contract Drawings.
5. When concrete placement is to be discontinued for more than 45 minutes and if the construction plane is to be horizontal, install keyways and embed dowel bars in the concrete before initial hardening. Use keyways and dowels in vertical concrete construction except when indicated or directed otherwise by the Commissioner.

3.3 DRILLING AND GROUTING DOWELS WITH EPOXY RESIN

- A. Drill holes for each dowel to the size and depth indicated on the Contract Drawings. Do not drill into or cut or otherwise damage existing reinforcement bars unless permitted by the Commissioner.
- B. Blow clean each finished hole with an air jet and then flush with a jet of clean water.
- C. Immediately prior to the grouting operation, remove all water from the hole and from the walls of the hole.
- D. Mix and place the epoxy resin completely around the dowel bar in strict accordance with the manufacturer's recommendations, with particular attention given to manufacturer's specified time limit within which the material must be placed after mixing. Do not retemper resin that has begun to stiffen; discard such resin.

3.4 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

- A. General: Comply with requirements of ASTM C94 and ACI 301, for batching, mixing and transporting concrete, and as modified herein.
- B. Mixing: Conform to the provisions of ASTM C94 and ACI 301. Machine mix concrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Dissolve admixtures in the mixing water and mix in the drum to uniformly distribute the admixtures throughout the batch. Place concrete within 90 minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates if the air temperature is less than 85°F.
1. Reduce mixing time and place concrete within 60 minutes if the air temperature is greater than 85°F. except as follows: if set retarding admixture is used and slump requirements can be met, limit for placing concrete may remain at 90 minutes.
 2. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted.
 3. If the entrained air content falls below the specified limit, add a sufficient quantity of admixture to bring the entrained air content within the specified limits.
- C. Transporting
1. Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete that has segregated in transporting and dispose of as directed.
 2. Do not use concrete that has stood for over 30 minutes after leaving the mixer, or concrete that is not placed within 90 minutes (or 60 minutes as specified herein) after water is first introduced into the mix.

3.5 PLACING CONCRETE

A. Preparation

1. Remove foreign matter accumulated in the forms.
2. Rigidly close openings left in the formwork.
3. Wet wood forms sufficiently to tighten up cracks. Wet other material sufficiently to maintain workability of the concrete.
4. Use only clean tools.

B. Conveying

1. Perform concrete placing at such a rate that concrete, which is being integrated, with fresh concrete is still plastic.
2. Deposit concrete as nearly as practicable in its final location so as to avoid separation due to rehandling and flowing.
3. Do not use concrete, which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated by foreign materials.
4. Remove rejected concrete from the job site.
5. Do not drop concrete more than 60 inches without the aid of an "elephant trunk" or similar device that prevents aggregate separation.
6. Placing concrete in forms:

- a. Deposit concrete in horizontal layers not deeper than 24 inches, and avoid inclined construction joints.
- b. Remove temporary spreaders in forms when concrete has reached the elevation of the spreaders.

C. Placing Concrete Slabs

1. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints and formed control joints, until the placing of a panel or section is completed.
2. Dry-screed slab surfaces to the correct level using continuous intermediate screed strips, continuous edge forms, or continuous bulkheads as appropriate, set to the proper elevation and slope and spaced at a maximum width of 12 feet.
3. Intermediate screed strips are required at all locations where sloped slabs intersect. Slope slabs toward drains as indicated on the Contract Drawings. The use of wet-screed guides is prohibited.
4. Use bullfloats to smooth the surface, leaving the surface free from bumps and hollows.
5. Do not sprinkle water on the plastic surface. Do not disturb the slab surface prior to start of finishing operations.

D. Placing Concrete Against Existing Concrete

1. Surface preparation: Clean existing concrete surface free of laitance, grease, oil and any other foreign matter which may inhibit bond in accordance with the requirements of ACI 318.
2. Intentionally roughen surface to minimum 1/4" amplitude.
3. Wet the contact substrate to a saturated surface dry condition and scrub with a cement slurry mixture just prior to placing new concrete.
4. Application of Epoxy Bonding Agent: Where indicated or otherwise approved by the Commissioner, apply a thin coat of compound to dry, clean surfaces. Scrub compound into the surface with a stiff-bristle brush. Place concrete while compound is tacky. Do not permit compound to harden prior to concrete placement. Follow manufacturer's instructions regarding safety and health precautions when working with epoxy resins.

E. Pumping: Conform to ACI 304R and ACI 304.2R. Pumping shall not result in separation or loss of materials nor cause interruptions sufficient to permit loss of plasticity between successive increments. Loss of slump in pumping equipment shall not exceed 2 inches. Do not use pipe made of aluminum or aluminum alloy. Avoid rapid changes in pipe sizes. Limit maximum size of coarse aggregate to 33 percent of the diameter of the pipe. Maximum size of well-rounded aggregate shall be limited to 40 percent of the pipe diameter. Take samples for testing at both the point of delivery to the pump and at the discharge end.

F. Hot and Cold Weather Requirements: Following are general requirements for concrete placement during hot and cold weather. For requirements of the salt shed walls, see "Concrete Wall Placement" notes on the structural drawings.

1. Follow the recommendations of ACI 305R and ACI 306.1 for placement of concrete during hot and cold weather conditions, respectively, and as specified herein.
2. Do not place concrete if its temperature at the time of placement exceeds 90°F and every effort has been made to maintain lower temperatures. If the temperature of the concrete

being placed is consistently above 75°F and a noticeable decrease in slump occurs, use a retarding admixture.

3. During hot weather, protect unformed surfaces of concrete from drying by continuous moist curing for at least 24 hours. Commence curing as soon as the concrete has hardened sufficiently to withstand surface damage. If moist curing is not carried beyond 24 hours, cover the surface while damp with a suitable heat-reflecting plastic membrane or spray with a white pigmented curing compound.
4. In the fall, from the time of the first frost and until the mean daily temperature at the site falls below 40°F, protect concrete from freezing for at least 24 hours after it is placed. When the daily mean temperature falls below 40°F, refer to subparagraphs 5 and 6 below. Protect concrete placed in the spring after the mean daily temperature at the site rises above 40°F until the danger of freezing is passed.
5. Do not allow concrete temperature to decrease below 50°F. Obtain approval prior to placing concrete when ambient temperature is below 40°F, or when concrete is likely to be subjected to freezing temperatures within 24 hours. When daily mean temperatures are generally below 40°F, maintain the temperature of the concrete at the time of placement not less than that specified in Chapter 3 of ACI 306.1 and continue to maintain the concrete at the recommended placement temperature for the duration specified in Chapter 5 of ACI 306.1. Initiate heating of aggregates, mixing water or both as needed to obtain the recommended placement temperatures. Do not permit the concrete temperature as mixed to exceed 45°F above the values specified in Lines 2, 3 and 4, as applicable, of Table 3.1 in ACI 306.1.
6. Maintain the temperature of concrete in place at 50°F or above by keeping forms in place, covering concrete with insulating materials, heated enclosures or employing combinations of these measures. Vent combustion heaters and do not heat or dry the concrete locally. Cure concrete during the period of temperature protection for such additional time as may be required to prevent exposed concrete surfaces from freezing or drying out.

3.6 CONSOLIDATION

- A. Consolidate each layer of concrete immediately after placing, by use of internal motorized concrete vibrators supplemented by hand spading, rodding or tamping. Comply with the requirements of ACI 309R using vibrations with a minimum frequency of 9,000 vibrations per minute.
- B. Do not vibrate forms or reinforcement.
- C. Do not use vibrators to transport concrete inside the forms.

3.7 CONCRETE FINISHING

- A. Concrete finishing of formed and unformed surfaces shall comply with the requirements of Section 03350 - Concrete Finishes.
- B. Placement and finishing of concrete topping overlays on freshly placed or on hardened concrete shall conform to the provisions of ACI 301 and Section 03350 - Concrete Finishes.

3.8 CURING AND PROTECTION

- A. General: Comply with the recommendations of ACI 301 and ACI 308 unless otherwise specified herein or indicated on the Contract Drawings. Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures and mechanical injury. Prevent concrete from drying by misting surface of concrete until curing commences. Begin curing immediately following final set. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, by rain or running water, adverse weather conditions, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the specified curing period.
- B. Moist Curing:
1. Ponding or Immersion: Continually immerse the concrete throughout the curing period. Water shall not be 20°F less than the temperature of the concrete. For temperatures between 40°F and 50°F, increase the curing period by 50 percent. Remove water without erosion or damage to the structure.
 2. Fog Spraying or Sprinkling: Apply water uniformly and continuously throughout the curing period. For temperatures between 40°F. and 50°F, increase the curing period by 50 percent.
 3. Pervious Sheeting: Completely cover surface and edges of the concrete with two thicknesses of wet sheeting. Overlap sheeting 6 inches over adjacent sheeting. Sheeting shall be at least as long as the width of the surface to be cured. During application, do not drag the sheeting over the finished concrete nor over sheeting already placed. Wet sheeting thoroughly and keep continuously wet throughout the curing period.
 4. Impervious Sheeting: Wet the entire exposed surface of the concrete thoroughly with a fine spray of water and cover with impervious sheeting throughout the curing period. Lay sheeting directly on the concrete surface and overlap edges 12 inches minimum. Provide sheeting not less than 18 inches wider than the concrete surface to be cured. Secure edges and transverse laps to form closed joints. Repair torn or damaged sheeting or provide new sheeting. Cover or wrap columns, walls, and other vertical structural elements from the top down with impervious sheeting; overlap and continuously tape sheeting joints; and introduce sufficient water to soak the entire surface prior to completely enclosing.
- C. Maintenance of Traffic: Restrict vehicular and pedestrian traffic from traveling on newly placed concrete floor slabs until the concrete has attained 75 percent of its minimum ultimate compressive strength as verified by three compressive strength tests.

3.9 PREFORMED COMPRESSIBLE JOINT FILLER INSTALLATION

- A. Install compressible joint filler where indicated on the Contract Drawings and in accordance with the manufacturer's instructions and recommendations.

3.10 JOINT SEALANT AND BACKER ROD INSTALLATION

- A. Install joint sealant to finish expansion joints where indicated on the Contract Drawings. Provide joint widths and sealant depths as shown, except that sealant depth shall not exceed 1/2 inch.

- B. Prepare joint surfaces to a sound, smooth, clean and dry condition free of visible contaminants. Where recommended by sealant manufacturer, apply compatible primer to dry joint surfaces.
- C. Control the depth of the sealant with the use of compatible joint fillers and backup materials. Install joint backing with approximately 30 percent compression to provide uniform depth of sealant in accordance with manufacturer's recommendations.
- D. Install joint sealant in strict accordance with manufacturer's recommendations.

3.11 CONSTRUCTION JOINT FILLER

- A. Provide narrow recess at the top of construction joints in the concrete wearing surface at the ground floor base slab as shown on the Contract Drawings.
- B. Prepare joint surfaces to a sound, smooth, clean and dry condition free of visible contaminants.
- C. After taping both sides of the joint, fill joint cavity flush or slightly higher than adjacent concrete surface with epoxy resin. Apply by brush or pour cans in accordance with the manufacturer's instructions.

3.12 NON-SHRINK GROUT

- A. Install non-shrink grout where indicated on the Contract Drawings and in accordance with the manufacturer's instructions and recommendations. In particular, follow manufacturer's instructions closely regarding surface preparation, mixing, placement and curing procedures.

3.13 CONCRETE TOPPING OVERLAYS

- A. Intentionally roughen substrate to receive concrete topping overlay to a minimum 1/8-inch amplitude prior to placement.
- B. Keep slabs continuously wet for 24 hours prior to concrete placement. Substrate to be air blown just prior to concrete placement.
- C. Place galvanized welded wire reinforcement with clear concrete cover to top surface as specified in Section 03100 - Concrete Forms and Accessories. Maintain continuity and integrity of wire reinforcement at all locations.
- D. Thoroughly mix the fiber reinforcement into the wet concrete mixture at the dosage rate recommended by the fiber manufacturer.
- E. Use a vibratory screed on overlays.
- F. Use evaporation retarder to reduce moisture loss and improve workability of fresh concrete as needed depending on environmental conditions.
- G. Finish overlay top surface and provide surface treatment in accordance with provisions of Section 03350 - Concrete Finishes. Use fog spraying and cure overlay with water or curing blankets.
- H. Continuously moist cure overlay for minimum of seven (7) days.

3.14 FIELD QUALITY CONTROL

- A. General: Special inspection and testing services required by the New York City Building Code, Local Law 76/2008, for structural concrete work, including concrete materials and construction operations, will be provided by the Special Inspector. The Special Inspector will arrange for plant inspection of concrete materials at the mixer, concrete placement, and for the sampling and testing of concrete cylinders.
1. Cooperate with the Special Inspector in the performance of its duties for special inspection. Assist the Special Inspector in performing all sampling and testing specified under Field Quality Control during construction by providing incidental labor to collect and store samples.
 - a. In cold weather conditions, provide a uniformly heated enclosure (minimum 65°F) for on-site storage of test cylinders until the testing laboratory picks them up.
 2. The Special Inspector will have a qualified representative(s) at the job site to perform concrete testing and to make all necessary test cylinders. Do not place concrete without the Special Inspector's on-site inspector present.
 3. The Special Inspector will also be responsible for curing, capping and breaking test cylinders used for compressive strength tests performed in the laboratory.
 4. Concrete inspection and testing will include but not be limited to the following:
 - a. Forms will be inspected to see that they are in the correct location and that they will result in concrete of the required dimensions as shown on the Contract Drawings.
 - b. Reinforcement installations will be checked for size, bending, spacing, location, firmness of installation, and surface condition. Reviewed shop drawings will be used in conjunction with the Contract Documents.
 - c. Operations of mixing, conveying, placing, compacting, finishing, and curing of concrete will be inspected and will include control of field proportioning and field testing.
 5. The Special Inspector will also be responsible for the following additional field inspection services:
 - a. Inspect concrete batching, mixing, and delivery operations in accordance with special inspection requirements of the New York City Building Code, Local Law 76/2008.
 - b. Check batching and mixing operations.
 - c. Review the manufacturer's report of each shipment of cement, aggregates and reinforcing steel and/or conduct laboratory spot checks of these materials as received.
 - d. Inspect the location and dimension of the forms, the placing of the reinforcing steel and the placing, conveying and depositing of the concrete.
 - e. Sample concrete at point of placement and other locations directed by the Commissioner and perform required tests.
 - f. Additional inspection and testing required because of changes in materials or mixture proportions requested by the Contractor. When required, such testing shall be performed at the Contractor's expense.

6. Identification: The Special Inspector will identify each test by number, mix, amount of admixture, origin of sample in the project, the date test specimen was made, the date test specimen was tested, the amount of slump determined, and the compressive strength test results.
7. Should test(s) yield results which do not meet the requirements of these specifications, the Contractor will be required to perform coring for additional testing and/or replacement of defective concrete.

B. Evaluation of Mixture Designs (Using Mockup for Formed Concrete)

1. The adequacy of the concrete mix design to produce the minimum specified strength and durability will be confirmed by testing field batches; casting concrete in a mockup for formed concrete at the job site using approved materials, equipment, and personnel; and testing the hardened concrete as described herein. The Contractor shall cast the mockup for formed concrete in accordance with the requirements specified in Section 03330 - Architectural Cast-in-Place Concrete.
2. The fresh concrete will be tested as follows:
 - a. Slump in accordance with ASTM C143.
 - b. Air content in accordance with ASTM C231 or ASTM C173.
 - c. Unit weight in accordance with ASTM C138.
 - d. For strength, nineteen (19) 6-inch by 12-inch cylinders will be cast in accordance with ASTM C31/C31M.
3. The 6-inch by 12-inch cylinders cast under subparagraph 3.14B.2.d above will be tested as follows:
 - a. Each specimen will be measured and weighed to determine unit weight as they are stripped from the molds.
 - b. Test specimens will be tested at each age for pulse velocity through concrete in accordance with ASTM C597.
 - c. Two specimens will be tested at each age of 24 hours and 3 and 7 days in accordance with ASTM C39.
 - d. Three specimens will be tested at each age of 28, 56, and 90 days in accordance with ASTM C39.
 - e. Two specimens will be tested at each age of 28 and 90 days in accordance with ASTM C496.
4. Twenty-five (25) additional 4-inch diameter hardened cores will each be extracted from the test slab and test wall in accordance with ASTM C42. Those to be tested at 7 days or earlier age will be drilled on the test date and tested as cored. Those to be tested at later ages will be drilled in adequate time for wet curing before testing. Cores will be tested as follows:
 - a. All cores will be tested at each age for pulse velocity through concrete in accordance with ASTM C597.
 - b. Two cores will be tested for static modulus of elasticity in accordance with ASTM C469 at age 28 days.
 - c. Two cores will be tested for specific gravity, absorption, and voids in concrete in accordance with ASTM C642.

- d. Three cores will be tested for resistance to chloride ion penetration in accordance with ASTM C1202 at ages 28 and 90 days.
 - e. Compressive strength in accordance with ASTM C39 as follows:
 - 1) Two cores at 24 hours
 - 2) One core at 3 days
 - 3) Two cores at 7 days
 - 4) Three cores at 28 days
 - 5) Two cores at 90 days
 - 6) Three spare cores
5. Sampling and determination of water-soluble chloride ion content shall be determined in accordance with ASTM C1218/C1218M. Maximum water soluble chloride ion concentrations in hardened concrete at ages from 28 to 42 days contributed from the ingredients including water, aggregates, cementitious materials, and admixtures shall not exceed 0.08 percent by weight of cement for non-prestressed concrete and 0.06 percent by weight of cement for prestressed concrete.
6. Test results will be submitted to the Commissioner for evaluation and acceptance.

C. Sampling

1. Sampling shall conform to ASTM C172. Samples of fresh concrete will be collected to perform tests specified. ASTM C31/C31M shall be followed for making test specimens.
2. Concrete will be sampled on a random basis except where a batch appears to be deficient and the test can be used to verify the observed deviation. Identify samples so taken in a manner that they can be isolated from other tests. At least one sample will be obtained for each 50 cubic yards, or fraction thereof, of each design mixture of concrete placed in any one day. When the total quantity of concrete with a given design mixture is less than 50 cubic yards, the strength tests may be waived by the Commissioner, if in its judgment, adequate evidence of satisfactory strength is provided.

D. Testing

1. The Commissioner will immediately notify the Contractor of any test results, which do not conform to specified requirements.
2. Slump Tests: Conform to ASTM C143. Concrete samples will be taken during concrete placement. The maximum slump may be increased as specified with the addition of an approved high range water reducing (HRWR) admixture provided that the water-cementitious ratio is not exceeded. Tests will be performed at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 10 cubic yards (maximum) of concrete.
3. Temperature Tests
 - a. The concrete delivered and the concrete in the forms will be tested. For building walls, every 10 cubic yards of concrete or fraction thereof that is placed shall be tested for temperature to meet temperature requirements indicated on the Contract Drawings. For other concrete, tests will be conducted in hot or cold weather conditions below 50° F. and above 80°F. for each batch (minimum) or every 10 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.

- b. The temperature of each composite sample will be determined in accordance with ASTM C1064. When the average of the highest and lowest temperatures during the period from midnight to midnight is expected to drop below 40°F for more than 3 successive days, concrete shall be delivered to meet the following minimum temperature at the time of placement:
- 1) 55°F for sections less than 12 inches in the least dimension.
 - 2) 50°F for sections 12 to 36 inches in the least dimension.
 - 3) 45°F for sections 36 to 72 inches in the least dimension.
 - 4) 40°F for sections greater than 72 inches in the least dimension.
- c. For other than building wall placements, the minimum requirements may be terminated when temperatures above 50°F occur during more than half of any 24-hour duration. The temperature of concrete at time of placement shall not exceed 90°F.
4. Compressive Strength Tests: Conform to ACI 214 tests for compressive strength. Strength tests of concrete will be performed during construction in accordance with the following procedures:
- a. Six 6-inch by 12-inch cylinders will be molded and cured from each sample taken in accordance with ASTM C31/C31M. Evaporation and loss of water from the specimen shall be prevented.
 - b. Cylinders will be tested in accordance with ASTM C39. One cylinder will be tested at 3 days, two cylinders at 7 days, two cylinders at 28 days, and one cylinder held in reserve. The compressive strength test results for acceptance shall be the average of the compressive strengths from the two specimens tested at 28 days. If one specimen in a test shows evidence of improper sampling, molding or testing, the specimen will be discarded and the strength of the remaining cylinder considered as the test result. If both specimens in a test show defects, the Commissioner may allow the entire test to be discarded.
 - c. If the average of any three consecutive strength test results is less than the specified strength (f_c) or the minimum test strength (f_{cr}) for durability, whichever is higher, by more the 500 psi, a minimum of three core samples will be obtained in accordance with ASTM C42 from the in-place work represented by the low test results. Locations represented by erratic core strengths will be retested and the Contractor will be charged for the cost of the retesting.
 - d. Upon review by and as directed by the Commissioner, the Contractor shall remove concrete not meeting specified strength criteria and provide new acceptable concrete. Repair core holes with non-shrink grout. Match color and finish of adjacent concrete.
 - e. Strength test reports shall include location in the work where the batch represented by a test was deposited, batch ticket number, time batched and sampled, slump, air content (where specified), mixture and ambient temperature, unit weight, and water added on the job. Reports of strength tests shall include detailed information of storage and curing of specimens prior to testing.
5. Air Content: Conform to ASTM C173 or ASTM C231 for normal weight concrete. Air content tests will be conducted on samples from the first three batches in the placement and until three consecutive batches have air contents within the range of the specified air content, at which time the procedure will be changed to test every fifth batch. This test

frequency will be maintained until a batch is not within the specified range at which time testing of each batch will be resumed until three consecutive batches have air contents within the specified range. Additional tests will be performed as necessary for control. Air content tests will be taken from planned composite samples or from samples taken in accordance with ASTM C172 at the point of concrete placement.

- E. Non-Destructive Tests: Use of the rebound hammer in accordance with ASTM C805, ASTM C597, or other non-destructive processes may be permitted by the Commissioner in evaluating the uniformity and relative concrete strength in place, or for selecting areas to be cored. Test results conducted on properly calibrated equipment will be evaluated and validated by the Commissioner in accordance with standard ASTM procedures indicated.
- F. Core Tests: Cores will be obtained and tested in accordance with ASTM C42. If concrete in the structure is dry under service conditions, cores (temperature 60°F to 80°F, relative humidity less than 60 percent) will be air dried for 7 days before testing and tested dry. If concrete in the structure will be more than superficially wet under service conditions, the cores will be tested, after moisture conditioning, in accordance with ASTM C42. At least three representative cores will be tested from each member or area of concrete in place that is considered potentially deficient. The strength of the structure shall be impaired as little as possible. If, before testing, cores show evidence of having been damaged subsequent to or during removal from the structure, replacement cores will be ordered. Fill core holes with low slump concrete or mortar of a strength equal to or greater than the original concrete. The Commissioner will evaluate and validate core tests in accordance with the specified procedures. Before testing in compression, each core will be tested to determine pulse velocity through concrete in accordance with ASTM C597. Correlate pulse velocity of concrete cores with pulse velocity of in-place concrete.
- G. Acceptance of Concrete Strength
1. Standard Molded and Cured Strength Specimens: Concrete strength will be considered acceptable when the averages of all sets of three consecutive compressive strength test results equal or exceed the design compressive strength (f_c) or the required field test strength (f_{cr}), whichever is higher, and no individual strength test falls below the specified compressive strength (f_c) or the required field durability strength (f_{cr}) by more than 500 psi, whichever is higher. These criteria also apply when accelerated strength testing is specified unless another basis for acceptance is specified.
 2. Non-Destructive Tests: Such tests may be used when permitted to evaluate concrete where standard molded and cured cylinders have yielded results not meeting the criteria.
 3. Core Tests: When the average compressive strengths of the representative cores are equal to at least 85 percent of the design strength (f_c) or the required average test strength (f_{cr}), whichever is higher, and if no single core is less than 75 percent of the specified strength (f_c) or the required average field test strength (f_{cr}), whichever is higher, the concrete strength will be considered acceptable.
- H. Verification of Miscellaneous Items to be Surveyed: The Contractor's Surveyor shall take optical survey measurements to certify the location of all conduit sleeves, concrete openings and anchor bolts for future work.

3.15 REMEDIAL WORK

- A. Repair or replace deficient concrete work as directed by the Commissioner and at no additional cost to the City of New York.

- B. Formed concrete repairs shall conform to those described in Section 03350 and as specified herein. Repair defective formed surfaces by removing minor honeycombs, pits greater than one square inch in surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink grout. Patch tie holes and defects when the forms are removed. Concrete with extensive honeycombing including exposed steel reinforcement, cold joints, entrapped debris, separated aggregate or other defects that affect the serviceability or structural strength will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair. The surface of the concrete shall not vary more than the allowable tolerances of ACI 347R. Exposed surfaces shall be uniform in appearance and finished to a smooth form finish unless otherwise indicated.
- C. Defects shall be defined by the more stringent of ACI 301 requirements for "Architectural Concrete" or the following:
1. Pockets of honeycomb (uncemented coarse aggregate) more than one-inch deep and 100 square inches in area are found.
 2. Sand streaks (pockets or streaks of uncemented fine aggregate more than one inch deep and 100 square inches in area) are found.
 3. Corners of forms are not filled.
 4. Bottom of concrete is not down to indicated levels or shows uncemented material at the bottom.
 5. Members are undersized.
 6. Concrete fails to "set-up" (indents under a hammer blow, after 7 days).
- D. Patch defective concrete surfaces with a suitable, approved patching material, mix or product as directed by the Commissioner.

END OF SECTION 03300

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SECTION - 03330 - ARCHITECTURAL CAST-IN-PLACE CONCRETE

PART 1-GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

1.02 SECTION INCLUDES

- A. This section specifies requirements for Cast-in-Place Architectural Concrete work, including concrete materials, mix design, formwork, reinforcement, placement and finishing procedures and other items required in producing of the work. Where an item is not included in this section, the requirements of the Cast-in-Place Concrete, Reinforcement & Formwork Sections shall apply.
- B. Work of this Section includes all labor, materials, equipment and services necessary to complete the architectural cast-in-place concrete as shown on the drawings and/or as specified herein.

1.03 RELATED SECTIONS

- A. This Section includes additional requirements for and relating to the following sections:
 - 1. Cast-in-Place Structural Concrete:
 - 2. Concrete Forms and Accessories
 - 3. Concrete Reinforcement
 - 4. Joint Sealants:

1.04 QUALITY ASSURANCE

- A. Contractor
 - 1. The contractor or subcontractor performing the work of this Section shall, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects with a major amount of high quality architectural cast-in-place concrete work.
 - 2. The cast-in-place concrete subcontractor, carpenter foreman, labor foreman and the reinforcing erector foremen shall have successful experience in performing cast-in-place concrete work that shows ability to perform architectural quality work and shall require approval for work on project. Submit projects, including name, description of responsibilities, scope of work, and references.

3. List of Recommended Contractors:

- a. Azarone Construction, 110 E. 2nd Street, Mineola, NY, 11501. Contact: Alan Bouknight, 516.742.4305.
 - b. Darcon Construction, 360 Meacham Avenue, Elmont, NY 11003. Contact: Angelo Caiazzo, 516.358.2532
 - c. Masedos Construction, 25 Minneakoning Road, Ste 200, Flemington, NJ, 08822. Contact: Tony Masedos, 908.806.3233.
 - d. Rogers & Sons, 385 Rt. 55, LaGrangeville, NY 12540. Contact: Manny or Tony Rodrigues, 845.227.6033.
 - e. Ruttura & Sons, 165 Sherwood Avenue, Farmingdale, NY, 11735. Contact: Tommy Ruttura Sr. 631.454.0291.
 - f. Tri-State. Contact: Dave McCarthy, 516.547.6727.
 - g. Villa Concrete Construction, 153 Broadway, Hawthorne, NY 10532. Contact: Anthony Dellorso, 914.747.3277.
 - h. Or approved equal.
- B. Concrete Quality Control Technician: Assign a quality control person to oversee the architectural concrete work. The primary duty is to be responsible for the required execution of the work. The Concrete Quality Control Technician shall develop a check list for execution of the work and for sign off by the concrete superintendent and submission to the Commissioner.
- C. Project Pre-construction Meeting: After approval of products and color samples and as early as possible, but not less than 30 days prior to the fabrication of the formwork, the Contractor shall schedule a meeting at a mutually agreed time. The meeting shall include the Commissioner, the Architect, the Architectural Concrete Consultant, the Contractor, the Concrete Subcontractor, the designated Quality Control Technician, Formwork Fabricator, Labor Foreman, Mix Designer, Testing Lab, and Concrete Supplier. Meeting agenda will be to discuss the materials, methods of forming and placing, coordinating and quality control procedures involved in the Architectural Cast-in-Place Concrete work and the interface with the non-architectural concrete and related work.

1.05 STANDARDS

- A. Comply with the requirements of the structural specification for the Cast-in-Place Concrete, Reinforcement & Formwork Sections, and as specified herein.

1.06 SUBMITTALS

- A. General: Do not proceed with the construction of the cast-in-place architectural concrete in the project, including fabrication of the formwork, until all samples, product data, mock-up and shop drawings have been approved by the Commissioner.
- B. Formwork Shop Drawings:
 - 1. Submit drawings showing the layout and details of formwork for the work, including the mock-ups.

2. Drawings shall include plans, elevations and sections to show layout of all exposed-to-view concrete work and interfacing adjacent concrete work and will include all walls, columns, soffits, stairs, cast-in items, depressions, openings, recesses, reveals, ties, control joints, construction joints and water-stopped joints.
3. Shop drawings shall include the following details:
 - a. Details of shop assembly of formwork and field assembly of construction and control joints, reveals, recesses, embedments, ties, back-up, clean out panels.
 - b. The means to be used to seal all joints, including back-up bracing, dry ties and brackets.
 - c. The means to be used to maintain alignment, including back-up bracing, etc.
 - d. Cover of all concrete over reinforcing steel.
 - e. Location of clear placing passages through the steel reinforcing for placing trunks and hoses.
- C. Placing: Submit layout or description of each placement showing sequence and projected time between deposits. See "Depositing" in Part 3 of this section.
- D. Product Data / Qualifications: Submit manufacturer's name and technical information for each of the following products and qualifications as listed below:
 1. Cement.
 2. Aggregates, each type
 3. Admixtures, each type
 4. Form surface material; tree species, size, moisture content
 5. Foam gaskets; thickness, width, foam compressibility
 6. Form release coating
 7. Reinforcing accessories
 8. Form ties and tie clamps
 9. Curing compound; base material type
 10. Solution for surface finish, each type
 11. Water repellent sealer
 12. Inserts and embedments, each type
 13. Concrete mix supplier certification

14. Qualifications for Concrete Carpenter, Laborer, Reinforcing Steel Foremen and designated Quality Control Person
15. Check list for use by the Concrete Quality Control Technician

E. Samples:

1. Formwork contact materials. Plastic overlay: 12 inches square. Boards: minimum of 6 boards with varying grain patterns for selection by the Commissioner.
2. Reveal form strips, each size, 12 inches long
3. Foam gaskets, 12 inches long
4. Form ties and cones, one each type, 12 inches long
5. Reinforcing supports, one each type
6. Crack control internal devices, each type, 12 inches long.
7. Submit three different cements of light gray powder. Each sample shall be one pint.
8. Submit concrete samples for color and texture determination.
 - a. Cast color samples in a form box with tightly sealed edges. For sample form box see drawing at end of section.
 - b. Submit for color determination. Cast samples 12"x12"x2-1/2", using specified smooth form material, approved cement, coarse and fine aggregates. Submit as required to attain approval of the Commissioner. Submit sample panels using three mixes as follows:
 - 1) Gray cement. One sample of each cement selected in 7 above.
 - 2) 65% gray cement with 35% granulated blast furnace slag replacement
 - 3) Finish with surface finish treatment on one-half the panel surface. One half panel surface shall be out-of-form.
 - 4) Submit as required to attain approval of the Commissioner.
9. Submit concrete sample to determine texture.
 - a. Cast one 36"x36"x5-1/2" sample panel using the approved design mix from color selection above. Cast vertically. Cast panel simulating techniques to be used in production to reduce the surface air voids and achieve the specified criteria as follows.
 - b. Finish all surfaces of the panels with approved finishes determined in small samples. Apply the finish treatment according to the direction of the Commissioner.
 - d. Forms shall be constructed with tight square corner seams. For sample form box see drawing at end of section.
 - e. Submit as required to attain approval of the Commissioner.

F. Mock-up for Formed Concrete Work:

1. After all samples, product data, and the shop drawings for the Mock-up are approved construct a mock-up of the work in a location approved by the Commissioner and as described below.
2. Mock-up shall consist of the following :
 - a. Foundation of a size and reinforcement adequate to support the work.
 - b. Wall as indicated on the drawings (at end of this section or on architectural drawings) and shall include:
 - 1) Wall – “L” shape plan, 20 ft. leg x 4 ft leg, 16 ft. high.
 - 2) Mock-up shall be placed in four placements with smooth form on all surfaces.
 - 3) One vertical construction joint.
 - 4) One vertical crack control joint, using Stainless Steel Water-stop and Crack control Device on each side.
 - 5) One horizontal construction joint.
 - 6) Form ties. Use ties as specified. Install ties leaving 1-1/2” hole and larger as selected by the Commissioner.
 - c. Reinforce as in a similar detail on the drawings and add necessary reinforcing and/or supports to maintain stability.
 - d. Use approved form facing material, reinforcement and accessories and assemble formwork as intended for the building construction.
 - e. Place concrete in the wall with methods to be used for typical long wall in building, including anticipated time delays between deposit lifts.
 - f. Finish exposed hardened surfaces of the walls with specified finish treatments when directed by the Commissioner and with the Commissioner, present. Finish wall with minimum 2 ft wide areas as directed by the Commissioner.
 - g. Use same concrete mix design for the mock-up as will be used in the construction of the final board formed walls.
3. If mock-up is not approved by the Commissioner, remove and replace with others at no additional cost to the City of New York.
4. Mock-up May be constructed in an off-site location within the City of New York where approved by the Commissioner. Mock-up shall be located so it can remain throughout construction. Protect mock-up from damage during construction. Remove mock-up when directed by the Commissioner.

- G. Concrete mix designs: As specified in Section “Cast-in-Place Structural Concrete” and as specified herein.

1.07 PERFORMANCE REQUIREMENTS

- A. Responsibility for the design of cast-in-place architectural concrete in conformance with the requirements of the drawings and specifications and performed using the highest standards of quality for visual and durable concrete rests with the contractor.
- B. Design of the mix and formwork shall be performed by contractor's licensed professional engineer, licensed to the project state, and submittals for the same shall be sealed by said engineer.
- C. Performance Criteria: All cast-in-place architectural concrete formwork shall be performed so that no evidence of the following will be evident when the concrete is subject to imposed loads, temperature and weather conditions:
 - 1. Damage of any kind.
 - 2. Formwork fastening penetrations or formwork anchoring devices or projections other than approved form ties and specified embedded items.
 - 3. Out of alignment or incorrect profiles.
 - 4. Surface voids not completely covered by a circle 11/16 inches in dia. (10 cent coin) or more than 25 surface voids larger than 1/8 inch, in longest dimension, in any area 1 ft. square.
 - 5. Voids, sand pockets or discoloration due to fluid loss through the formwork.
 - 6. Rockpockets and honeycombs.
 - 7. Discoloration caused from staining and from improper placing of the concrete.
- D. If any of the above-mentioned deficiencies occur, the Commissioner may order the affected concrete replaced or repaired with acceptable concrete. Repair only when directed by the Commissioner. Corrected deficiencies must meet with the approval of the Commissioner.

PART 2- PRODUCTS

2.01 GENERAL

- A. All materials shall be new or in like new condition, free from defects which will impair achieving the specified durability or appearance of the architectural cast-in-place concrete.

2.02 CONCRETE MATERIALS

- A. Each concrete material shall be the product of a single plant and raw material source throughout project.
- B. Cement: ASTM C-150, Type I.
 - 1. Cement shall be lightest gray colored powder available.

2. Cement shall be consistent in color presentation throughout the duration of the project.
- C. Coarse Aggregate: ASTM C-33. washed, hard, crushed gray quarry stone, maximum size $\frac{3}{4}$ ".
- D. Fine Aggregate: ASTM C-33. Hard, natural sand. Particles finer than a 50 screen shall be light gray in color.
- E. Admixtures:
 1. Admixtures must be certified to be compatible with the cement, aggregates, and other constituent materials in the mix and shall contain less than 0.05% of Calcium Chloride.
 2. Water Reducing Admixture: ASTM C494, Type F or G
 - a. Regular Concrete or Self Consolidating Concrete: High Range Water Reducing Admixture (HRWR): Glenium Series by BASF-Master Builders, Cleveland, OH; Eucon 37 or Plastol Series by The Euclid Chemical Co; ViscoCrete or Sikament by Sika Corporation, Lyndhurst, NJ; or approved equal.
 3. Viscosity Enhancing Admixtures:
 - a. Self-Consolidating Concrete (SCC): Shall include viscosity enhancing materials.
 - b. Admixture shall be manufactured by a company certified to conform to the requirements of the quality, environmental and occupational health & safety standards ISO 9002, iso 14001 and OHSAS 18001.
 - c. Admixture shall be Rheomac VMA 362, 358, 450 by BASF-Master Builders, inc. Cleveland OH; Viscrol or Eucon ABS by The Euclid Chemical Co; Sika Stabilizer 4R by Sika Corporation, Lyndhurst, NJ; or approved equal.
 4. Cement Replacement Admixture: use one of the following (as determined by samples)
 - a. White Granulated Blast Furnace Slag: "NewCem" by Lafarge Cement Co.; comparable product of Holcim Inc. or Lehigh Cement Company; or approved equal.
 - b. Fly ash or silica fume not permitted in architectural concrete.
 5. Air Entraining Admixture: ASTM C260.
 6. Admixtures for retardation and acceleration may be used if shown there is no adverse effect on architectural requirements and are approved for use.

F. Water: Potable

2.03. FORMWORK MATERIALS

A. Exterior Smooth Surface Formwork:

1. Shall be a form liner system as follows and shall be the same material on all surfaces.
 2. General:
 - a. Liner system shall be fabricated to meet the profiles in the architectural drawings.
 - b. Liner system shall enable stripping without chipping or damaging the profile articulation.
 - c. Liner system shall have unit connecting seams that seal tightly and present minimal lines on the concrete surfaces.
 3. Liner system with PVC, Elastomeric, Fiberglass
 - a. Acceptable Liner System manufacturers are as follows:
 - 1) Fitzgerald Form Liners, Santa Ana, CA.
Contact: efitz@formliners.com
 - 2) Kreysler & Associates, American Canyon, CA.
Contact: bk@kreysler.com:
 - 3) Greenstreak Group, Inc., St. Louis, MO; Phone (800) 325-9504.
 4. Shop built plywood liner units: plastic coated, birch or pine plywood, 3/4" thick panels, with minimum 7 plies per inch for softwood plywood and 14 plies per inch for hardwood plywood, in sizes to cover surface areas between joint lines shown on the drawings. All seams at breaks shall be sealed and fluid tight with support back-up.
 - a. Panels shall be one of the following:
 - 1) "WISA-Form Pro as manufactured by Plywood & Door Corp., Union NJ.
 - 2) "Multipour" as supplied by Olympia Products, Portland, Oregon, Shelton, WA, www.olypanel.com, or approved equal.
 - 3) "ArmorPly" as manufactured by Sylvan Industries, Portland, OR, www.sylvanindustries.com.
- B. Form Ties: Shall be manufactured specifically for use as concrete ties and shall be designed to seal tightly to the form face material without fluid loss. Ties shall be of sufficient strength to resist fluid concrete placing pressures at the longest span of support used in project. Ties shall be one of the following as selected by the Commissioner in the Mock-up structure:
2. Tapered He-bolt/Stud tie. Size of stud at contact face shall be minimum 1-1/2" in diameter.
 3. Through-the-wall rods with cones. Cones shall have a thread connection penetrating the face form panel to clamp tight to the form surface. Cones shall be minimum 1-1/2" in diameter.
- C. Joint Sealing Material:
1. Foam gaskets for sealing field erected corner form joints shall be highly compressible foam rubber or neoprene tape, paper backed, with pressure sensitive adhesive on one side, and shall be of sufficient width and thickness for specific use.

- a. Tape shall be as manufactured by 3M, St Paul, MN; the Chamberlin Rubber Company, Inc. Rochester, NY, (585) 427-7780; or equal.
 - b. Tube dispensed, liquid rubber that hardens fast into a gasket strip shall be "R-Guard Joint Sealant" as manufactured by ProSoCo, Lawrence.
2. Sealant for sealing permanent shop or bench fabricated unrevealed joints shall be silicone caulking. Sealant shall be "Silprif" as manufactured by General Electric; "Silicone caulk" by DAP Corp.; comparable silicone caulking by Dow Corning; or approved equal
- D. Reveal Form Strips shall be one of the following:
1. Rigid Polyethylene: (white slick plastic) milled smooth on all contact drafted surfaces.
 2. Hard tight grain wood, milled smooth on all contact surfaces and sealed with liquid polyurethane on all surfaces.
 3. Surfaces shall not have projections, saw marks or deformities.
- E. Crack Control Device:
1. Device for crack control joints at exterior surfaces shall be a steel unit fabricated with attachments for securing to the reinforcing bars and manufactured for installation inside the form cavity. Devices at interior and exterior shall be stainless steel bent to a water-stop configuration. For exterior surfaces device system shall be continuous units from building envelope seal at grade to seal at roof or top of wall. If top of wall is exposed install continuous inverted "U" shape device. Space devices maximum 10 feet apart unless otherwise noted on the drawings.
 2. Crack Control Devices supplied by one of the following:
 - a. Engineered Devices Corp., Ridgefield Park, NJ. Contact Greg Limbaro, (201) 641-2880.
 - b. Contractors Supply, 3340 Pawtucket Ave, East Providence, RI, 02915. Contact Dave Murphy, (401) 434-4300.
 - c. Vimco, 300 Hansen Access Road, King of Prussia, PA 19406. Contact Victor Maggitti, (610) 768-0500.
- F. Form Release Coating: Colorless, non-staining and having no deleterious effects on the concrete, manufactured specifically for non-absorbent surfaces and for reducing surface voids. Release Coating shall be "Cretelese 880" by Cresset Chemical Co., Weston, OH.; "L&M Release" by L&M Construction Chemicals, Inc. Omaha, NE; "Cast-Off" by BASF-MasterBuilders, Cleveland, OH; . or approved equal.

2.04 REINFORCING AND ACCESSORIES

- A. Accessories in contact with vertical form surfaces shall be high density plastic "wheels" with feet in contact with the form maximum of 1/8"x3/8". Center hole engaging reinforcing shall hold the wheel tight to the bar and maintain the dimension required under placing conditions. Multi-leg string spacers will not be permitted.
- B. Tie wire used to secure reinforcing steel adjacent to architectural form surfaces shall be non-corrosive or plastic coated wire.
- C. Accessories shall be EZ systems by Aztec, Atlanta, GA; General Technologies Inc., Stafford, TX; Dayton-Superior, Dayton, OH; Engineered Devices Corp., Ridgefield Park, NJ; or approved equal

2.05 MISCELLANEOUS MATERIALS

- A. Curing Material / Evaporation Retarders: VOC compliant, colorless, diffusive, blend of Sodium, Potassium and Meta Silicate and be able to retain water in concrete with minimal loss during high temperatures and without rapid loss of moisture. Shall not contain wax, resin or acid. Material shall be compatible with the specified Silane sealer. Material shall be "L&M Cure" by L&M Construction Chemicals, Inc. Omaha, NE; "SealTight Med-Cure" by W .R. Meadows, Inc., Hampshire, IL.; "Masterkure" by BASF-Master Builders; or approved equal.
- B. Concrete Clean/Etch Solution: Shall be a commercial concrete cleaner containing solvents, chloride acids and stain removers, with no more than 1.5% acid content. Cleaning and etching solutions shall be used as determined on the Mock-up application tests. Solutions shall be as follows:
 - 1. Sure-Klean "Heavy Duty Concrete Cleaner"
 - 2. Clean/Etch Solutions shall be by ProSoCo, Lawrence, KS; comparable products of Dietrich Technologies, Inc., Oak Creek, WI. or Vexcon Chemicals, Inc. Philadelphia, PA; Or approved equal.
- C. Concrete stain removers and general cleaners shall be as follows:
 - 1. Rust stains – T#1087, T#1047
 - 2. Lime Stains: Pre-Klean
 - 3. Calcium stains – T#2012
 - 4. 2010 "Light Duty Concrete Cleaner" and "Enviroclean"
 - 5. Cleaners listed above and removers and general cleaners as recommended by ProSoCo, Lawrence, KS; comparable products of Dietrich Technologies, Inc., Oak Creek, WI, or Vexcon Chemicals, Inc. Philadelphia, PA; or approved equal.

- D. Water Repellent shall be a low molecular, minimum 95% solid, Clear, Penetrating, Silane sealer.
1. General sealer at non-touchable areas – (SL100)
 2. Oleophobic sealer at touchable areas – (SLX100)
 3. Sealers shall be “SL100” & “SLX100”, by ProSoCo, Lawrence, KA. Contact. Alex Somohano, WBS, (908) 770.2660.
 4. Comparable clear silane sealers by BASF-Master Builders, Cleveland, OH, or by Pecora Corporation, Harleysville, PA.
- E. Sealant for Reveals at construction joints not receiving a Water-stopped Crack Control Device: Shall be a one component, low modulus, non-sag, elastomeric, non-sag silicone sealant. Color shall be a standard color as approved by the Commissioner.
- F. Patching Bonding Material: Shall be a liquid, acrylic-polymer bonding agent specifically made to bond new mortar with hardened concrete. Additive shall be “Acryl Set” by BASF-Master Builders; SBR Latex, Flex-con or Akkro-7T by The Euclid Chemical Co; “Sika Latex R” by Sika Corporation; or approved equal.
- G. Waterstop for Vertical Construction Joints: shall be a Bentonite impregnated foam neoprene strip with paper backed, pressure sensitive, adhesive material. Water-stop shall be "Volclay" by American Colloid Co., Arlington Heights, IL; “Swellstop” by Greenstreak, St. Louis, MO; “Superstop” by Tremco, Beachwood, OH; or approved equal.
- H. Gasket adhesive remover shall completely remove any adhesive residue and shall not discolor concrete surface. Remover shall be “Asphalt and tar remover – 509” by ProSoCo, Lawrence, KA.; comparable products of Dietrich Technologies, Inc., Oak Creek, WI, or Vexcon Chemicals, Inc. Philadelphia, PA; or approved equal.
- I. Elastomeric Coating for exposed concrete at roof edge where there is no coping or cover:
1. Coating shall be a trowel-on polymer enhanced elastomeric coating.
 2. Coating color and texture shall be as approved by the Commissioner.
 3. Coating shall be one of the following:
 - a. “Resistite Protective Coating” by Dex-O-Tex. Manufactured by Crossfield Products Corp, Roselle Park, NJ.
 - b. Terapro Pedestrian Traffic Waterproofing System by Siplast of Irving, Texas.
 - c. “Flexdeck” by Euclid Chemical Company, Cleveland, OH. .

PART 3 - EXECUTION

3.01 CONCRETE MIXTURES

- A. Comply with the requirements of Section for Cast-in-Place Concrete, and as specified herein. Architectural concrete shall be either regular or self-consolidating concrete that meets the following criteria and is approved for use.
- B. Regular concrete shall have the specified Cement, Cement Replacement Admixture, Air Entraining Admixture & a High Range Water Reducing Admixture.
- C. Self-Consolidating Concrete shall be as specified for regular concrete plus the use of a Viscosity Modifying Admixture and a polycarboxylic ether based hyperplasticiser.
- D. Mix shall be designed for minimum water content allowable (optimum slump prior to admixture: 2.0 inches or water/cementitious ratio of 0.40 or less).
 - 1. For Regular Concrete fluidity shall be attained by the addition of HRWR to a slump of 8" \pm 1".
 - 2. For Self Consolidating Concrete (SCC) fluidity shall be attained by the addition of HRWR+VMA, to a minimum slump spread of 25 and a Visual Static Stability Index of 1. Slump spread and Static Stability shall be measured by test method MB-RCD-01, specified in ASTM C143.
- E. Mix design shall designate the optimum duration of fluid stability for the mix for the maximum discharge time planned.

3.02. FORMWORK

- A. Fabrication:
 - 1. Comply with the requirements of the Section Cast-in-Place Concrete - Formwork, and as specified herein.
 - 2. Design formwork to permit easy removal. Prying against the concrete will not be permitted. Care shall be taken so as not to mar the concrete surface in cutting or removal of the forms.
 - 3. The forms shall be completely rigid and strong enough to withstand without deflection, movement or fluid loss at the high hydraulic pressures that result from the rapid filling and vibration required for architectural concrete placing. Hydraulic pressures: Design forms to limit deflections of plywood supports to L/400.
 - a. Formwork shall be designed for a minimum placement rate of 8 ft/hour. In forms higher than 8 feet formwork shall be designed for a higher rating if the concrete set rate is determined by the mix analysis to be fluid longer than the rate of placement.

- b. Self consolidating concrete shall be designed for full liquid head unless the mix can be demonstrated to attain the specified surface quality at a lower rate.
 4. Forms shall be fabricated so the concrete can be adequately placed, vibrated and finished to achieve the specified finishes.
 5. Transitions between adjacent planes of Architectural Cast-in-Place Concrete surfaces shall be without use of chamfers or radiused forms, unless otherwise specifically shown on the Architectural Drawings.
 6. Layout form ties, form joints, reveals and exposed embedments as shown on the drawings.
 - a. Ties: shall be located as shown on the drawings. If placing loads are deemed excessive using locations shown a proposed tie layout shall be submitted for approval.
 - b. Drill tie holes in form panels from contact face using brad point twist bit with edge cutters (scribes circle edge prior to surface cutting).
 - c. Tie holes shall be sized to render fluid tight connections between the form and the tie at the contact location
 - d. Tapered ties shall have reamed holes that fit the taper tightly at the position required.
 7. Smooth plywood panel surfaces:
 - a. Edges of plastic overlay form panels shall be square, flat and sealed. Seal all cut edges (end grain, including tie holes) with liquid polyurethane.
 - b. Install sealant in all fabricated butt joints of plastic overlay form panels to prevent fluid loss. At butting plywood panel edges place a bead of sealant (1/8" max) at back edge (away from contact face) of one panel prior to butting interface edge surfaces. Take care not to allow sealant to come in contact with form surface. Contact form surface shall be free of sealant prior to casting concrete.
 - c. Back fasten plastic face panels with screws to minimize the penetrations through the plastic faced panels, achieving a rigid gang form. Use one of the following:
 - 1) Install a full backing sheet.
 - 2) Install wood or metal clips at supports where face panel seams are located and in other locations to maintain panel stability.
 8. Smooth PVC, Elastomeric or Fiberglass liner surfaces:
 - a. Units shall be molded to the profiles shown on the drawings.
 - b. Connecting seams between units shall have means of fastening reveals securely and with a tight seal without penetrating unit surfaces.
- B. Form Erection:
1. Use only form units where face panels are in undamaged condition. Replace damaged panels as required to maintain surface in a condition to achieve the specified treatment.

2. Use screw type fastening devices to maintain alignment, and to tightly close joints at corners, end forms, square columns and at bulkheads. Apply pressure at joint to resist concrete placing pressure as close to the joint as possible. See suggested form construction detail at the end of this section.
 3. Vertical and horizontal construction joints shall be at locations approved by the Commissioner before the erection of formwork begins and shall be formed so the joint is straight, in plane and flush with the adjacent surface. Horizontal construction joints shall be at a joint seam shown on the drawings. Vertical construction joint shall be a straight line presentation on the surface. See suggested form construction details at the end of this section.
 - a. Gaskets shall be installed in corner joints and bulkheads assembled and disassembled in field, place a gasket in the form joint. Install gasket away from contact edge 1/16" to 1/8". See suggested form construction detail at the end of this section.
 4. Crack Control Joints (vertical surfaces):
 - a. Install internal crack control devices in walls at joints where shown on the drawings.
 - b. At all exterior surfaces install a stainless steel water-stop device between the form and the reinforcing steel.
 - c. At walls wider than 16" install a stayform sheet between the reinforcing layers.
 - d. At interior surfaces install a minimum 3/4" deep reveal directly across from the stainless steel device on the exterior surface.
 - e. Crack control devices shall be installed maximum 10 feet apart between construction joints and be located at form joints. A construction joint is considered to be a crack control joint.
 - f. See suggested form construction detail at the end of this section.
 5. Water-stops (vertical & horizontal): Shall be as follows:
 - a. At construction joints exposed to weather install a Bentonite waterstop strip at center of in-place concrete. Install full height at vertical joints. Install length of placement at horizontal joints. Do not install between reinforcing steel and form face. Install in keyway if keyway is required by the Cast-in-Place Structural Concrete Section.
- C. Coating of Forms: Prior to use, all forms shall be coated with the specified form release coating in accordance with the manufacturer's written instructions.
1. Coat evenly and remove excess material from form surface with a damp absorbent cloth.
 2. Surface applied with specified release agent shall not be oily to the touch.
 3. Do not allow coating to come in contact with previously placed concrete or with reinforcing steel.

3.03 FORMWORK TOLERANCES

- A. Hydraulic pressures: Design forms to limit deflections of members supporting facing panels to L/400. Formwork shall be designed for full liquid head.
- B. Finish Lines: Fabricate and position formwork to maintain hardened concrete finish lines within the following allowable variations.
 - 1. From designed edge elevation in 10 ft. +1/4 inch, -0 inches
 - 2. From designed vertical plane in 10 ft. +1/4 inch, -0 inches
 - 3. Cross-Sectional Dimensions: +1/4 inch, -0 inches
 - 4. Smooth form surface to surface at butt joint Maximum variation of panel thickness – fabricate panel edges tight to back-up member.
 - 5. It is the intent of this specification that the formwork will be erected in such a manner that lines and surfaces are visually presentable without obvious defects. Where lines and planes require adjusting from one placement to another adjust the forms to realign in a visually acceptable manner.

3.04 REINFORCEMENT

- A. Comply with the requirements of Cast-in-Place Concrete Reinforcement Section, and as specified herein.
- B. Support accessories are to be used at exposed vertical surfaces only when absolutely necessary to maintain cover. Place “wheel” supports at walls no closer than 6 ft. apart. Multi-legged supports are not permitted.
- C. Layout reinforcement in walls to assure a clear passage from top to bottom at least 10 feet apart where placing regular concrete and as required for Self Consolidating concrete. Clear passage shall be free of bands, ties, conduit and other obstructions to allow easy insertion of the pump hose or placing trunks to the bottom of the form.
- D. Tie wire for reinforcing steel shall be tied in a manner so that wire ends will point away from the architectural formwork surface and not project into the clear cover area between the bars and the form surface.
- E. All reinforcing steel, including bands, shall be secured a minimum of 3” from the contact surface of the formwork prior to placing concrete.

3.05 MIXING AND TRANSPORTING CONCRETE

- A. All concrete for each placement, or a minimum of two truck loads shall be on the site prior to starting the placement. The concrete shall be completely discharged into the forms within the time determined by the design mixes to be the optimum duration of fluid stability provided by the mix design. In no case will the concrete be placed after excessive stiffening of the concrete has occurred. Discharge two trucks into the pump or bucket at one time in a manner that will enable one truck to be half full and discharging while the other is finished and being replaced with another truck.

3.06 PLACING CONCRETE

- A. Before placing concrete in the forms, verify that all forms have met all requirements specified; that reinforcing steel, embedded materials are in place and securely anchored; that forms are absolutely clean; and that entire preparation has been approved by the Concrete Quality Control Technician and has been reviewed by the Commissioner.
- B. Cleaning and Protecting Forms: Immediately prior to placing concrete, clean all form interiors free of foreign material and debris.
 - 1. Force debris out of forms prior to closing the last section with a jet stream of compressed air and/or water. Where form openings are not available, collect debris with vacuum cleaners and heavy duty magnets. Remove all wire clippings, sawdust and other debris from wall, beam and soffit bottoms.
 - 2. Protect cleaned forms if placing does not commence immediately, covering openings with tarpaulins.
- C. Depositing Concrete:
 - 1. General requirements (Regular and SCC):
 - a. Concrete for walls, columns and spandrels shall be placed with trunks, or pump hoses inserted onto the form cavity.
 - b. Deposit concrete as nearly as practical at its final position, but not farther than 5 ft. horizontally from the final position.
 - c. Place concrete by inserting pump hose, or trunks into form to face of fresh concrete. Place an adequate number of trunks in wall and deep spandrel forms to enable a continuous placement without causing delays in moving trunks.
 - d. Provide a shut off at pump hose as close to the top of the form insertion "needle" as possible and activate when inserting and removing "needle" from form cavity to reduce splatter on form surfaces.
 - e. Deposit layers in walls or deep spandrels shall not exceed 30 inches in height. Top deposit lift of placement shall not exceed 18 inches in height.
 - f. Deposits of concrete in placements shall have a subsequent deposit place on top and/or adjacent to the fresh face and consolidated within 30 minutes. Plan

construction joints and placements so that the placing sequence will follow this requirement.

2. Regular Concrete

- a. Do not drop concrete more than 12 inches.

3. Self Consolidating Concrete:

- a. Deposit SCC by inserting the pump hose onto the form void at the center point of the placement to the bottom.
- b. Keep the end of the hose into the wet mix throughout the placement.
- c. At walls with openings above the base of the placement place the concrete to the bottom of the opening and then place one side to the mid point of the opening, then the other side to the top of the opening. Then continue the placement full length of the form.
- d. At walls with openings starting at the base of the placement fill the void between the openings to the top of the opening and then continue the placement full length of the form.

D. Consolidating Concrete:

1. Regular Concrete

- a. All concrete shall be consolidated by internal vibration using two vibrators at each placement. One vibrator shall follow deposit location and consolidate concrete after deposit is leveled. Optimum diameter of vibrator head shall be 1" to 1½". Vibrators shall be placed into the concrete vertically at a consistent spacing that will thoroughly blend the deposits, remove entrapped air, and consolidate the concrete. Vibrator head shall be inserted rapidly and withdrawn slowly and evenly to remove maximum amount of entrapped air (optimum withdrawal speed approx 2" to 4" per second). Do not jiggle vibrator up and down during consolidation, use continuous and even insertion and withdrawal of vibrator.
- b. After top out leveling in walls and spandrels, the concrete shall be allowed to set 10 to 15 minutes and then shall be given a final vibration of the top 20 inches. Immediately thereafter the top surface shall be finished as required.
- c. Caution must be exercised in using vibrators to prevent injury to the form surface material or displacement of embedded items.
- d. Keep one spare working vibrator on site at all times.
- e. Vigorously tap form facing panels just below deposit area during consolidation with rubber mallets. Strike in an even and consistent pattern to break up large entrapped air bubbles at the contact form face.

2. Self Consolidating Concrete: Place concrete in such a manner that vibration is not necessary to consolidate the concrete and will produce a surface with minimal surface voids. Hammering form with rubber hammers and minor vibration at some locations may be required.

3.07 CURING AND FORM REMOVAL

- A. Cure all concrete for a minimum of five days.
- B. Cure formed concrete surfaces by one of the following methods:
 - 1. Leave the formwork securely in place and cover the exposed top surface tightly with polyethylene sheet. Cover shall insure protection from rain and allow minimal moisture loss from the concrete mass.
 - 2. Immediately after stripping, fog the surface (fine mist nozzle on hose) and apply the specified curing compound.
 - 3. Cover forms and concrete while in curing period to protect from direct sunlight.
- C. Form Removal:
 - 1. Comply with the stripping requirements of Cast-in-Place Concrete Section, and as specified herein.
 - 2. Care shall be taken so as not to mar the concrete surfaces in removing the forms.

3.08 FINISHES FOR FORMED PLACEMENTS

- A. All exposed work shall be finished with the approved finishes determined from sample tests executed in Part 1 on the mock-up. Finishes shall be as specified herein on the building exterior and where indicated on the drawings. Minor defects may require fins to be removed (i.e. top edges) or minor patching performed, however, it is the intent of this specification that the work will be performed in such a manner that only the specified clean treatment, water repellent application, and tie hole finishing will be required after stripping.
- B. General: Prior to treating, all surfaces shall receive the following preparation and cleanup.
 - 1. All surfaces to receive treatment shall be a minimum of 21 days old. All surfaces can be treated at end of project.
 - 2. Remove all stains using an appropriate non-abrasive stain remover for each type.
 - 3. During operations, protect all adjacent work. At completion of day's work leave area clean. At completion of work, remove all equipment, waste and excess material and leave area clean.
- C. Treat the formed concrete surfaces with the following etch-clean applications:
 - 1. Treatment is required only if application tests on the mock-up are approved for use on the building.

2. Etch-Cleaning Treatment for smooth concrete surfaces:

- a. General: Apply cleaners in an even manner break to break and joint to joint of surface, allow to set the required time, and thoroughly flush with pressure spray in a consistent manner. Pressure and amount of flush water shall be as directed by the manufacturer.
- b. After stripping the surface shall be treated for stain removal.
- c. Apply the following surface treatments, when directed by the Commissioner, as determined by the Commissioner on the mockup.
- d. Etch-Clean Treatment shall produce a "matte" surface by just roughening the surface of the cement skin. Treatment shall not expose any aggregate larger than that passing a #20 sieve. Etch Treatment shall be with "Heavy Duty Concrete Cleaner".
- e. Cleaning treatment shall not etch the surface but clean the surface to a consistent even presentation. Treatment shall be with "2010" or "Enviroclean".

3. Water Repellant:

- a. Treat all exposed vertical wall surfaces after the above treatment as follows:
 - 1) Apply oleophobic sealer SLX100 to all exterior surfaces.
 - 2) All surfaces receiving treatment shall be dry as required by the manufacturer's instructions.
 - 3) All surfaces receiving treatment shall be clean and free of stains and laitance.
 - 4) Where curing agent other than specified sodium silicate based material used, curing agent must be completely dissipated prior to application of sealer so that sealer will be absorbed into the concrete. Test specified sealer in small area in inconspicuous location to determine if concrete curing material has sufficiently dissipated for proper application of sealer.
 - 5) To all surfaces apply one wet coat of the specified sealer as per manufacturer's instructions.

4. Top-of-wall Treatment not covered with another coping material:

- a. Apply a polymer enhanced, elastomeric coating on the top of all concrete surfaces at the edge of the roof not covered with another material.
- b. Apply according to manufacturer's instructions for the specific application. Include a prime coat and mesh reinforcement if recommended by the manufacturer.
- c. Trowel on the coating 1/8" thick except at the edge 2", which shall feather to 1/16' at the wall top edge.
- d. Cover top surface and edge to interface with membrane or flashing.

- D. Formed Square Corner Edge Treatment: After concrete is hard use a fine masons stone or fine grit sanding block on the edge to achieve an eased edge with a 1/16 inch radius. Take care not to scar the adjacent surface. This applies to two adjacent vertically formed corner surfaces and to a formed surface adjacent to a trowel finished top surface.

E. Tie Hole Treatment:

1. At tie holes plug the hole with one of the following methods as determined on the mock-up.
 - a. Fill the hole void with a color matching mortar and tool the hole to recess the mortar surface in the hole as directed by the Commissioner. Prior to application of mortar apply wide blue painters tape around the hole 8" from the hole on all sides. Take care not to allow mortar to be in contact with the finished wall surfaces.
 - b. Fill the hole void with mortar and install an anchor insert in the hole for attaching a reflector as directed by the Commissioner. Prior to application of mortar apply wide blue painters tape around the hole 8" from the hole on all sides. Take care not to allow mortar to be in contact with the finished wall surfaces

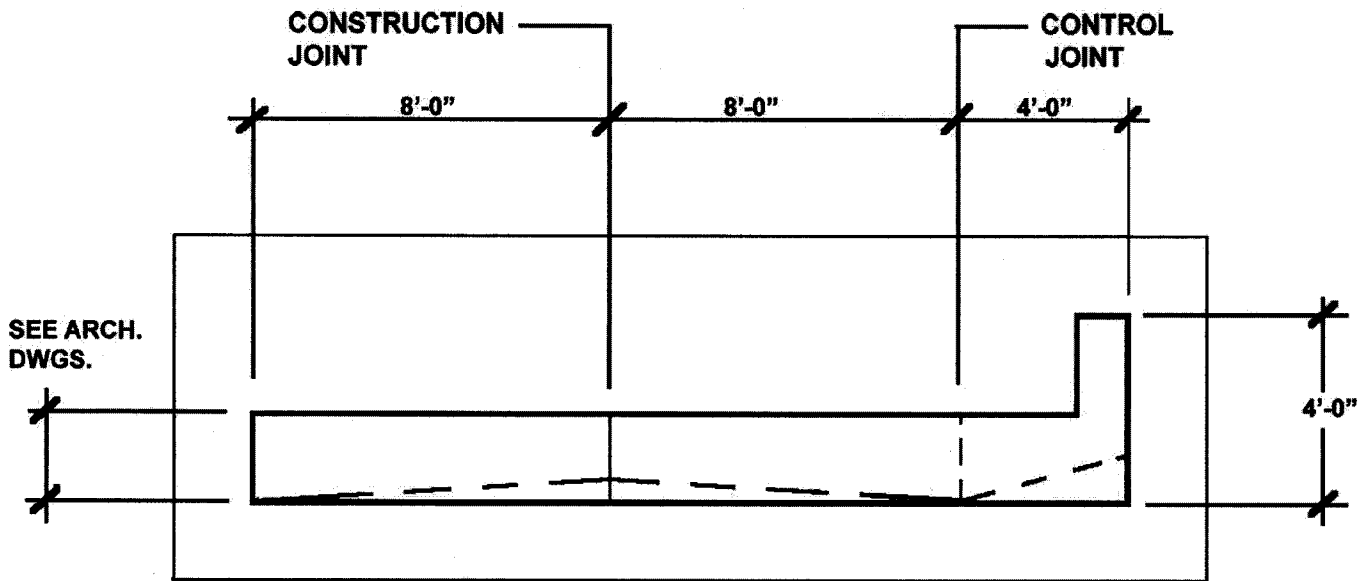
- F. Patching: Only areas designated by the Commissioner shall be patched. Where minor patching is required as approved by the Commissioner as a means of rendering the surface acceptable, it shall consist of patching with a texture matching technique and color matching mortar mix. Test patches shall be placed on the mock-up or other approved surface and approved by the Commissioner prior to commencing any patching of the work. Final patching mortar shall be one part cement and two fine parts sand (maximum 00) mixed with a liquid acrylic-polymer bonding additive.

3.09 PROTECTION

- A. Protect all Architectural Cast-in-Place Concrete surfaces from damage of any kind. Pay special attention to surfaces near work of other trades and surfaces near ground. All Architectural Concrete surfaces shall be free of damage at the time of acceptance. Allowing damage and patching or cleaning at end of project is not acceptable. Cover wall surfaces with a self supporting stand-off panel system where vulnerable. Locate field shops in areas where operation will not damage exposed surfaces. Protection shall assure protection from paint, oils, rust, stains, impact, or any other kind.

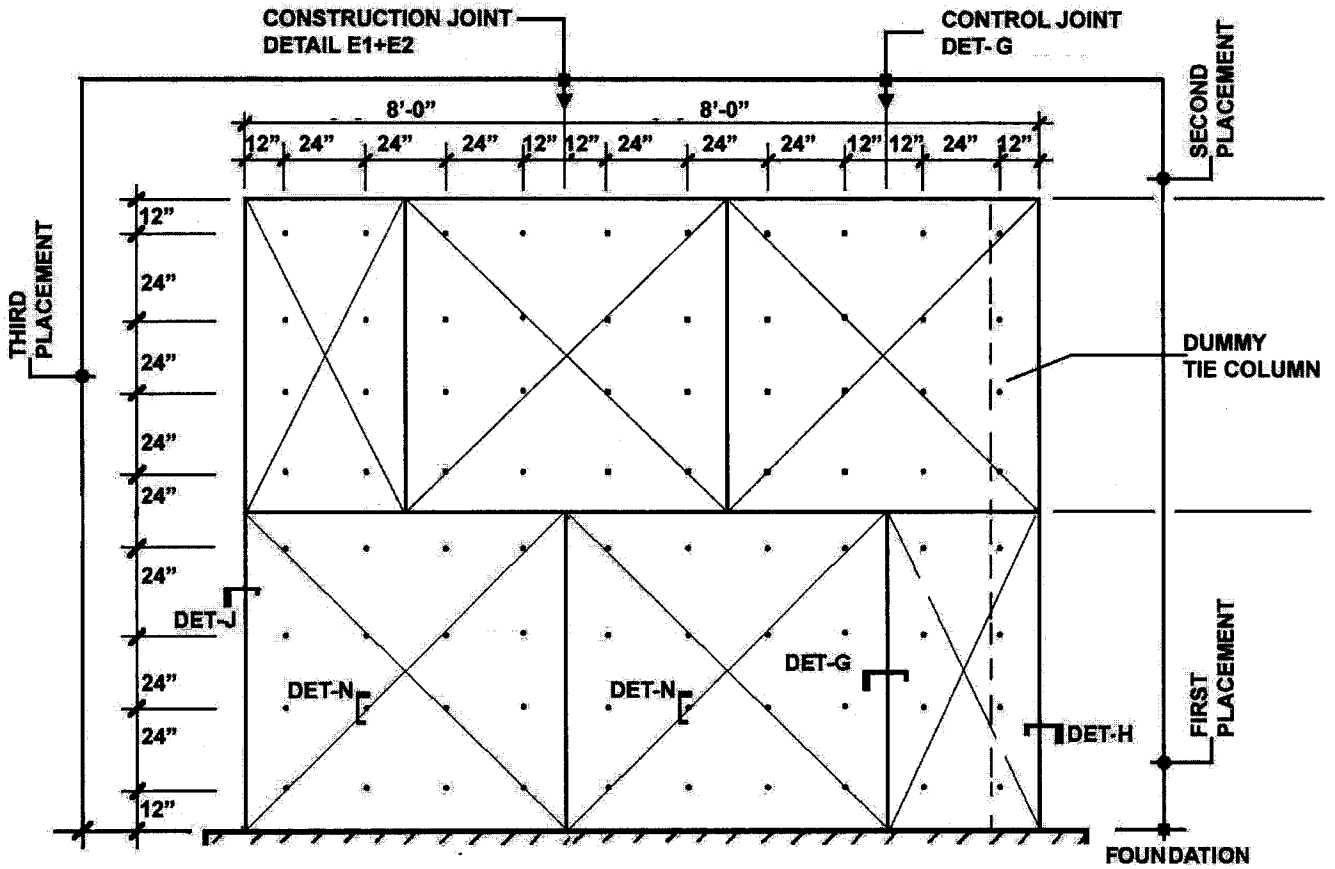
3.10 MOCK-UP DRAWINGS

A. The following drawings represent the mock-up structure.



DETAIL - A PLAN

WALL MOCK-UP SCOPE



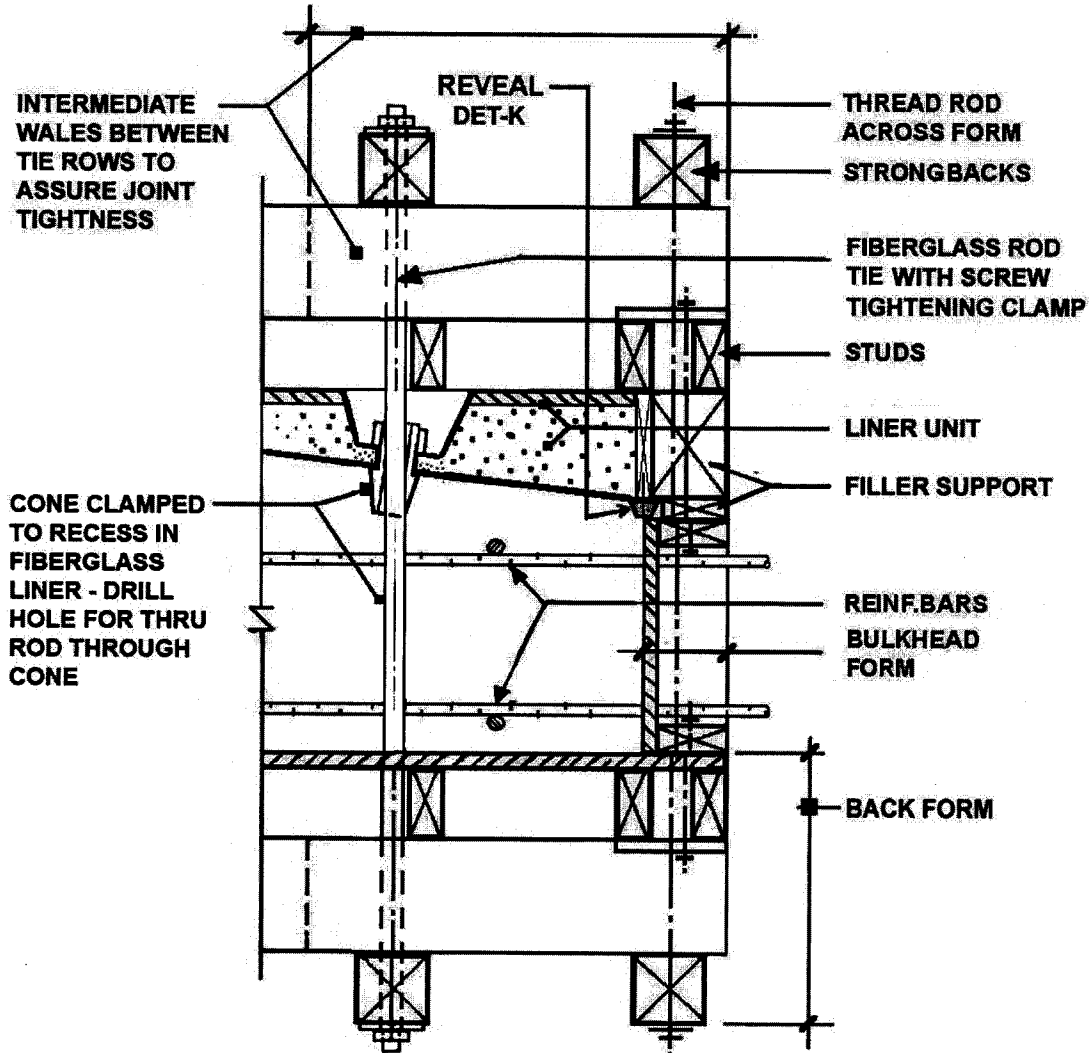
DETAIL - Ba ELEVATION

WALL MOCK-UP SCOPE

END OF CONTRACT SECTION

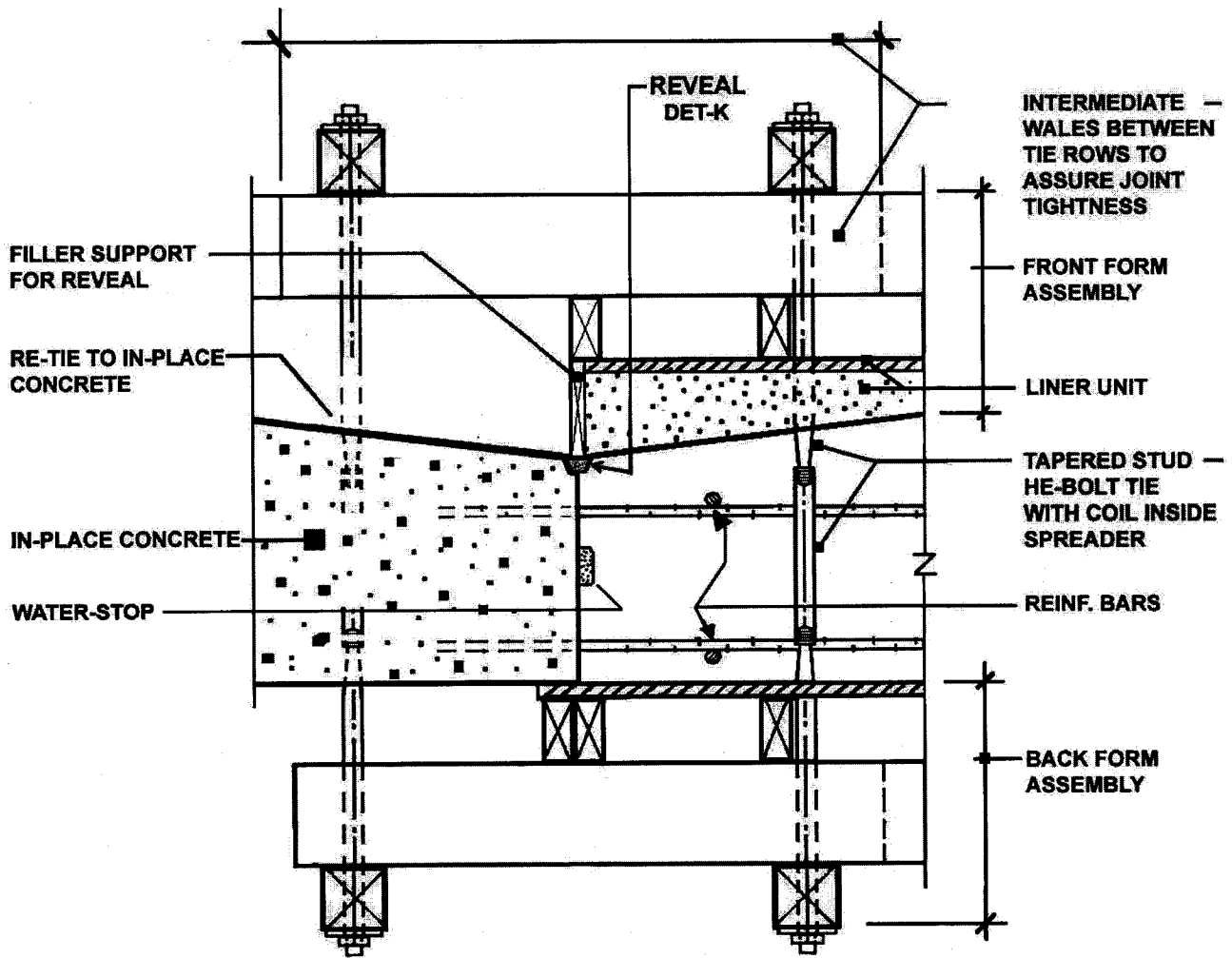
3.10 QUALITY FORMWORK DETAILING EXAMPLES

A. The formwork drawings on the following pages are not part of the contract documents. They represent examples of the formwork principles required to perform the level of quality for work described in the contract documents and are intended to clarify the contract documents only.



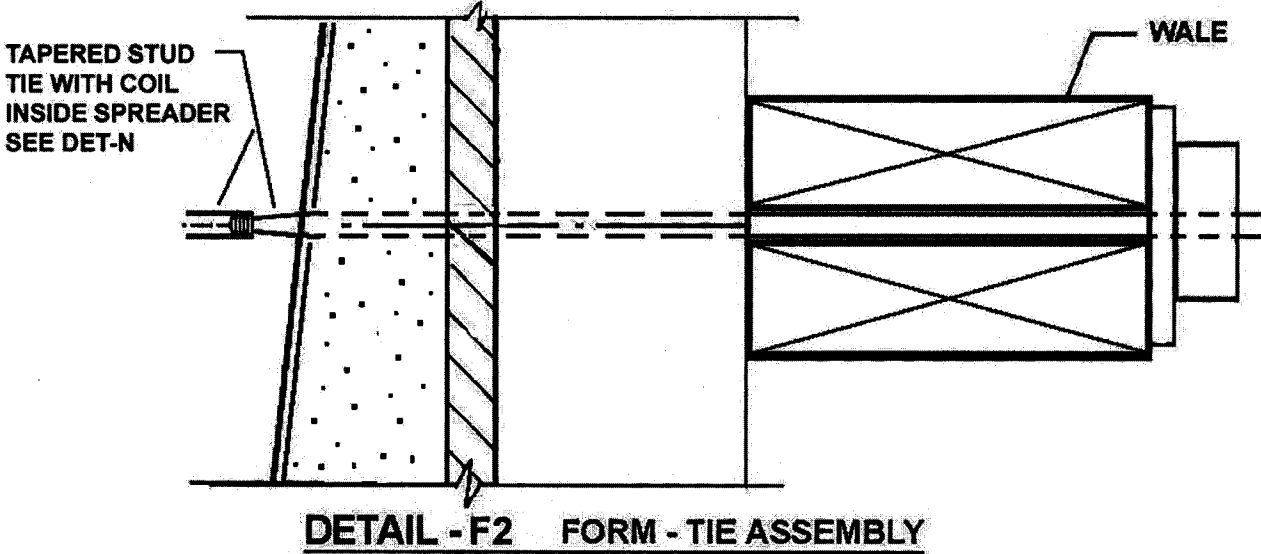
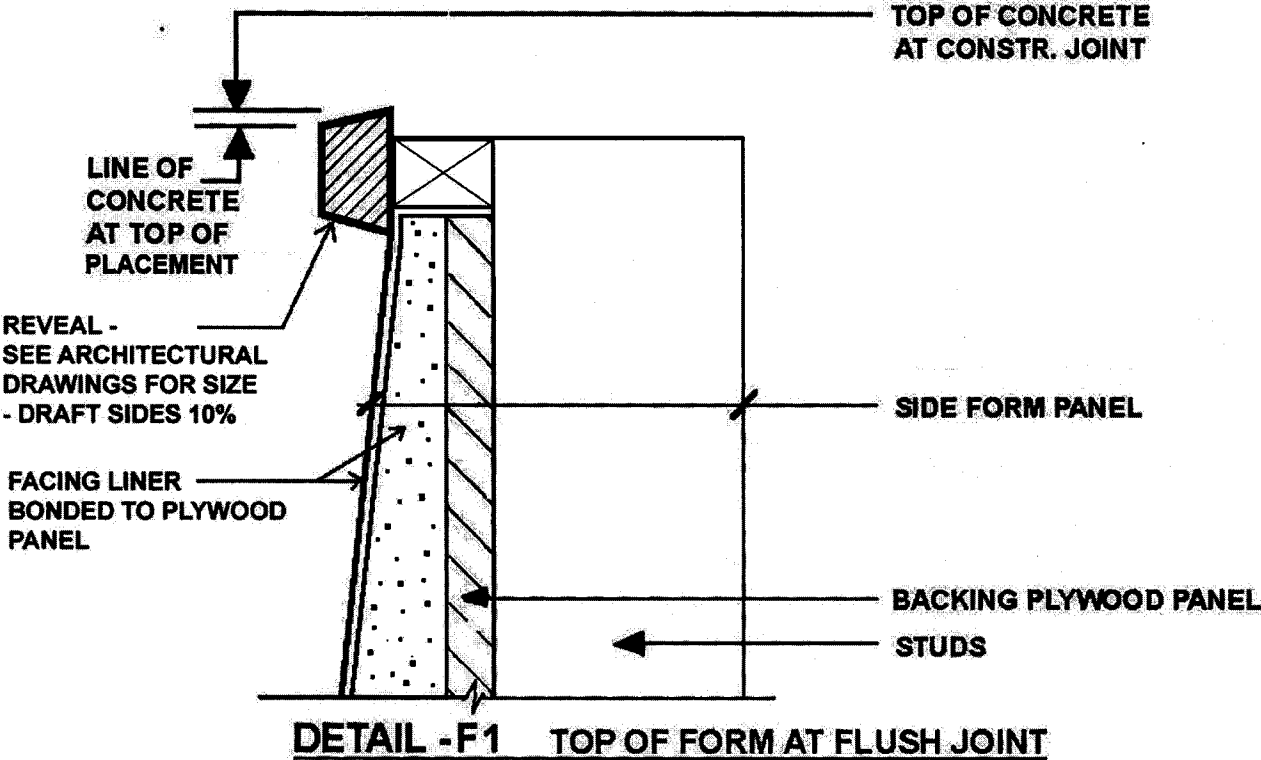
**DETAIL - E1 WALL REVEALED CONSTRUCTION JOINT
FIRST PLACEMENT FORMWORK ASSEMBLY
SHOWING CONE AND THRU ROD TIE SYSTEM**

TYPICAL FORMWORK DETAILS

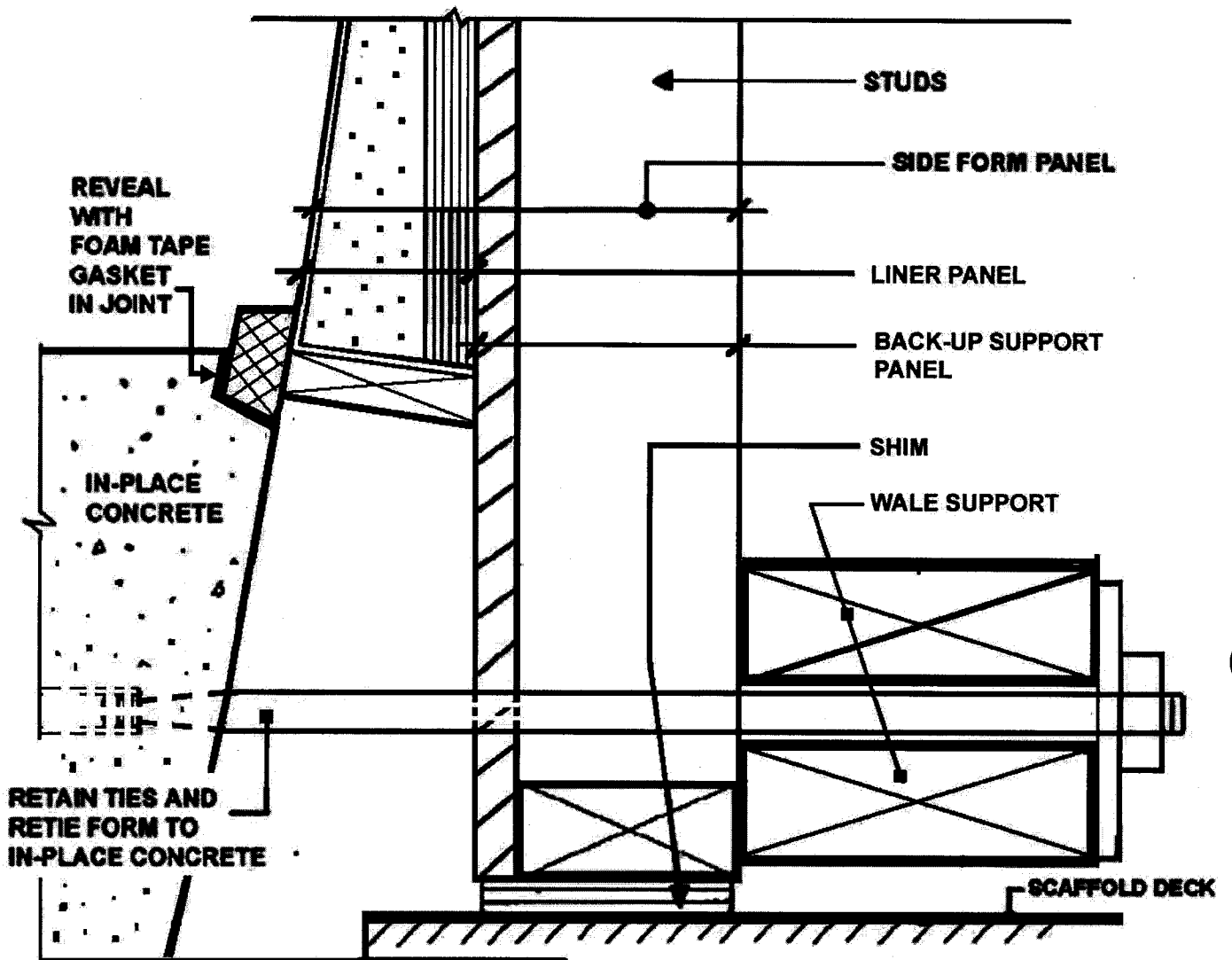


DETAIL - E2 WALL REVEALED CONSTRUCTION JOINT
SECOND PLACEMENT FORMWORK ASSEMBLY
SHOWING TAPERED STUD TIE

TYPICAL FORMWORK DETAILS

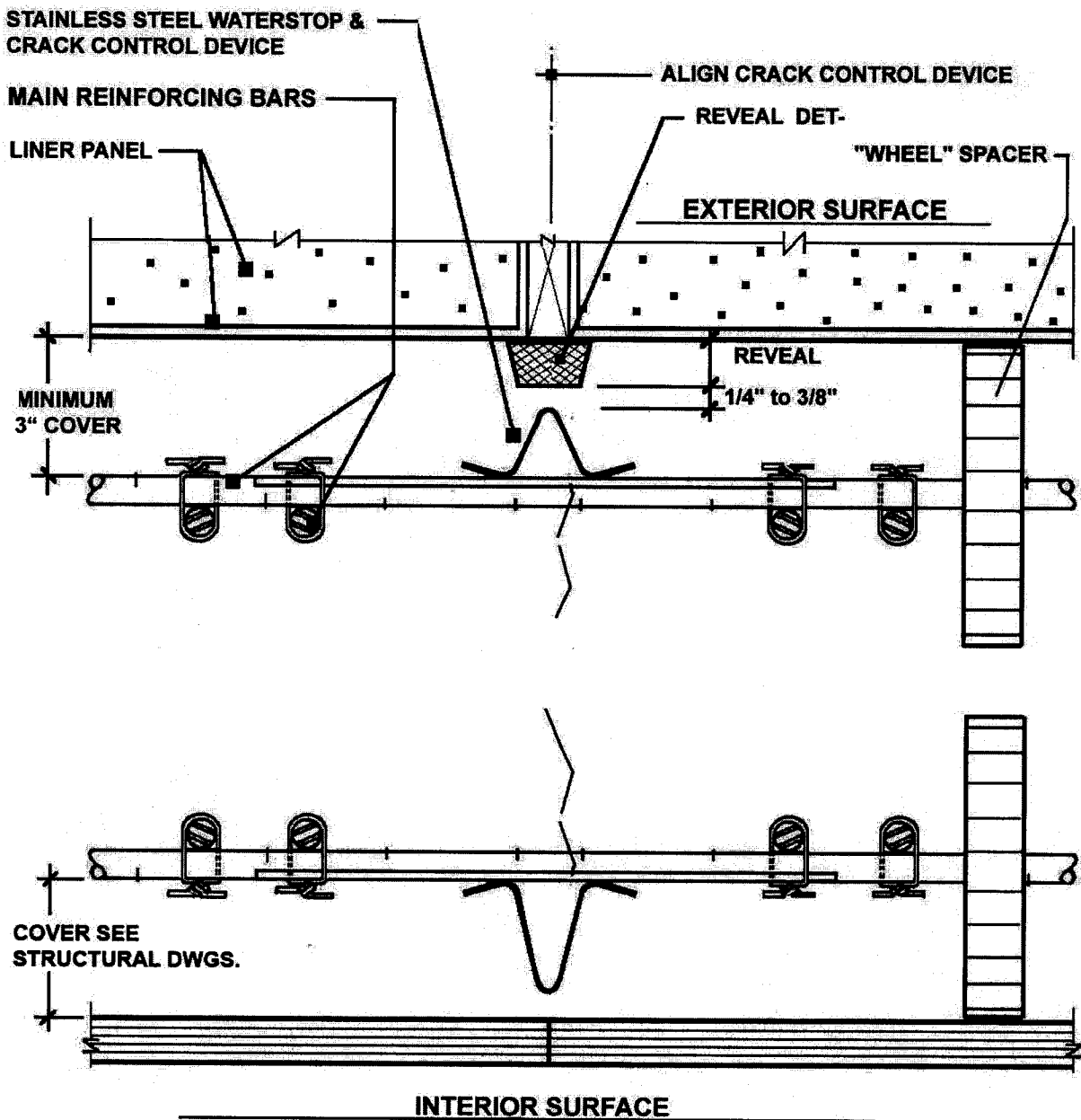


TYPICAL FORMWORK DETAILS



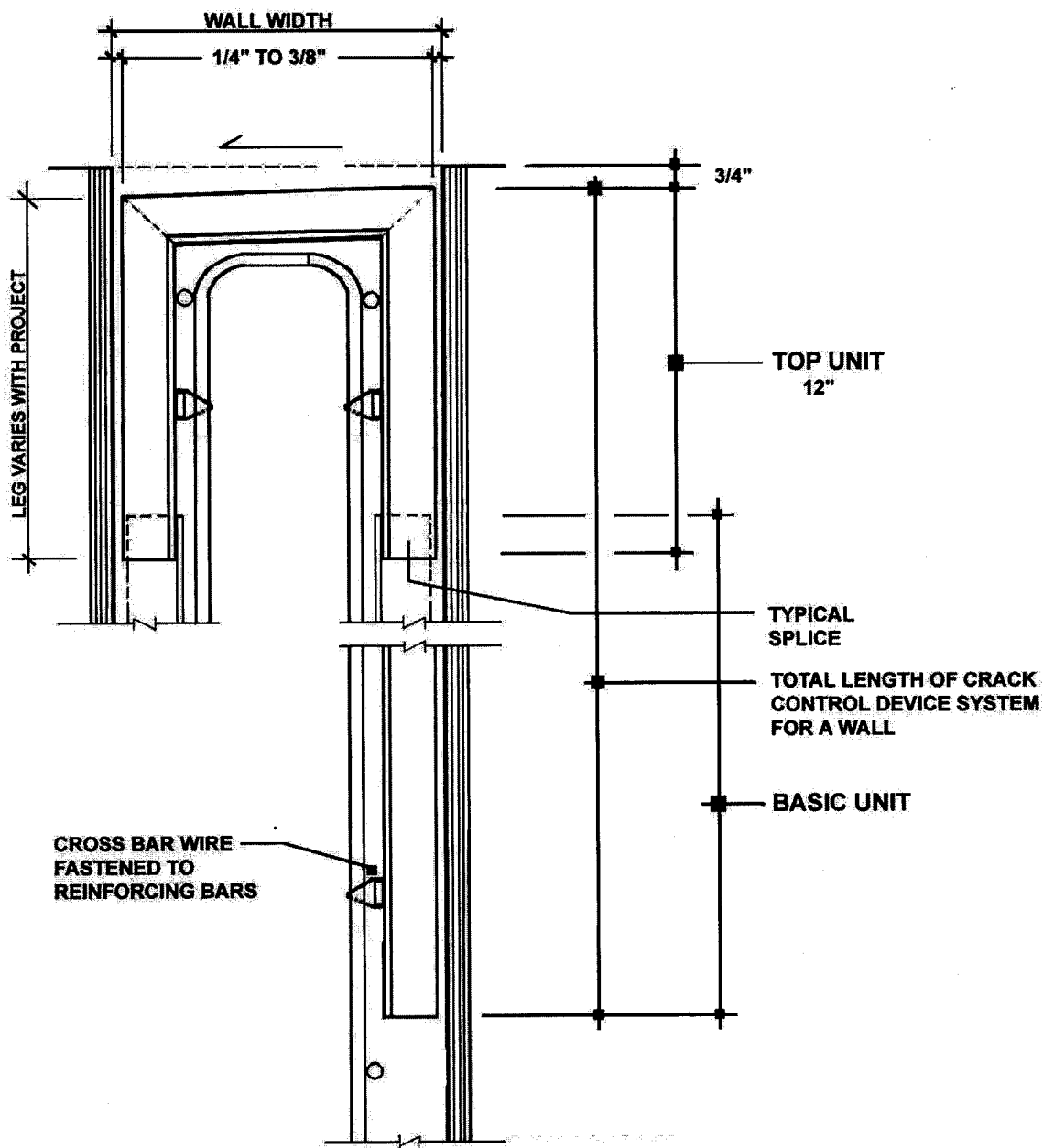
DETAIL - F3 HORIZONTAL CONSTRUCTION JOINT
FORM ASSEMBLY SECOND PLACEMENT

TYPICAL FORMWORK DETAILS



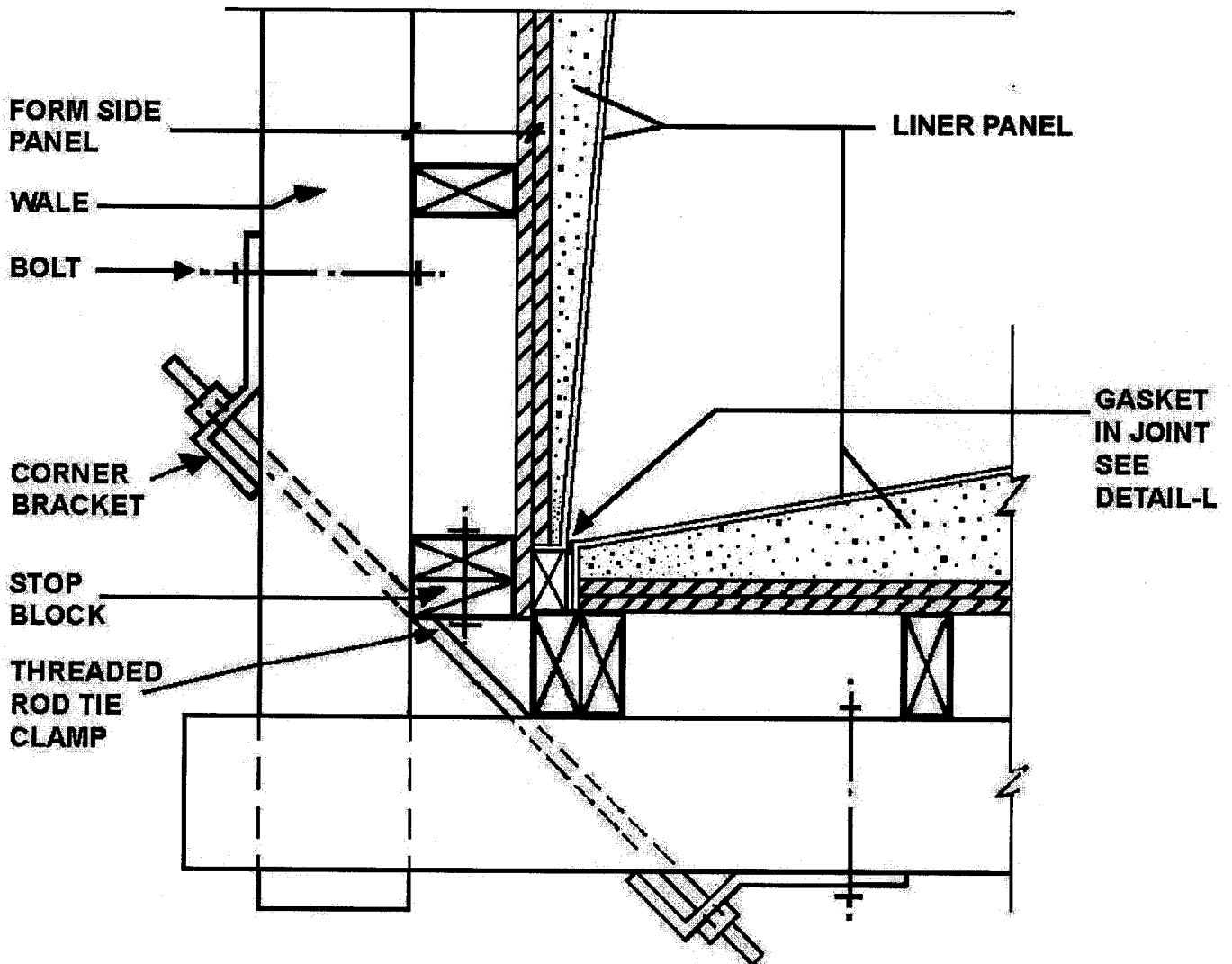
DETAIL-Ga IN-THE-WALL CRACK CONTROL DEVICE

TYPICAL FORMWORK DETAILS



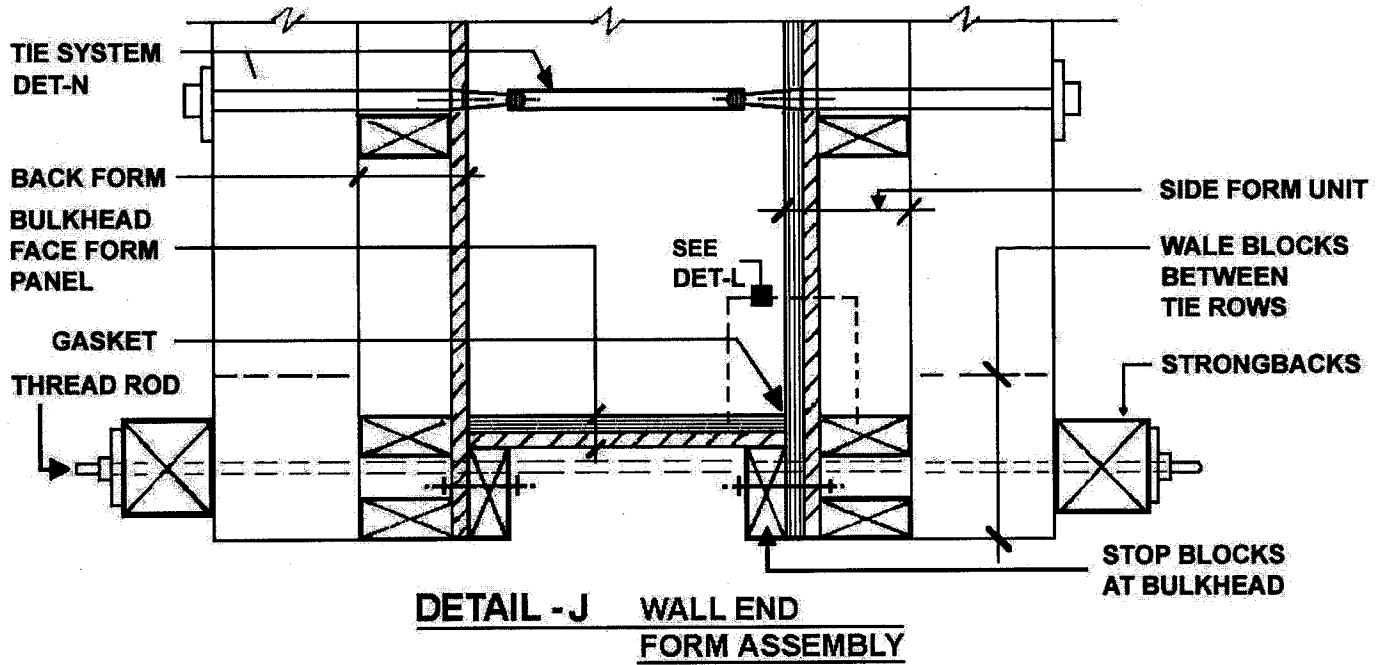
DETAIL - Gb FULL HEIGHT SECTION - INSTALLATION OF INTERNAL CRACK CONTROL UNITS

TYPICAL FORMWORK DETAILS

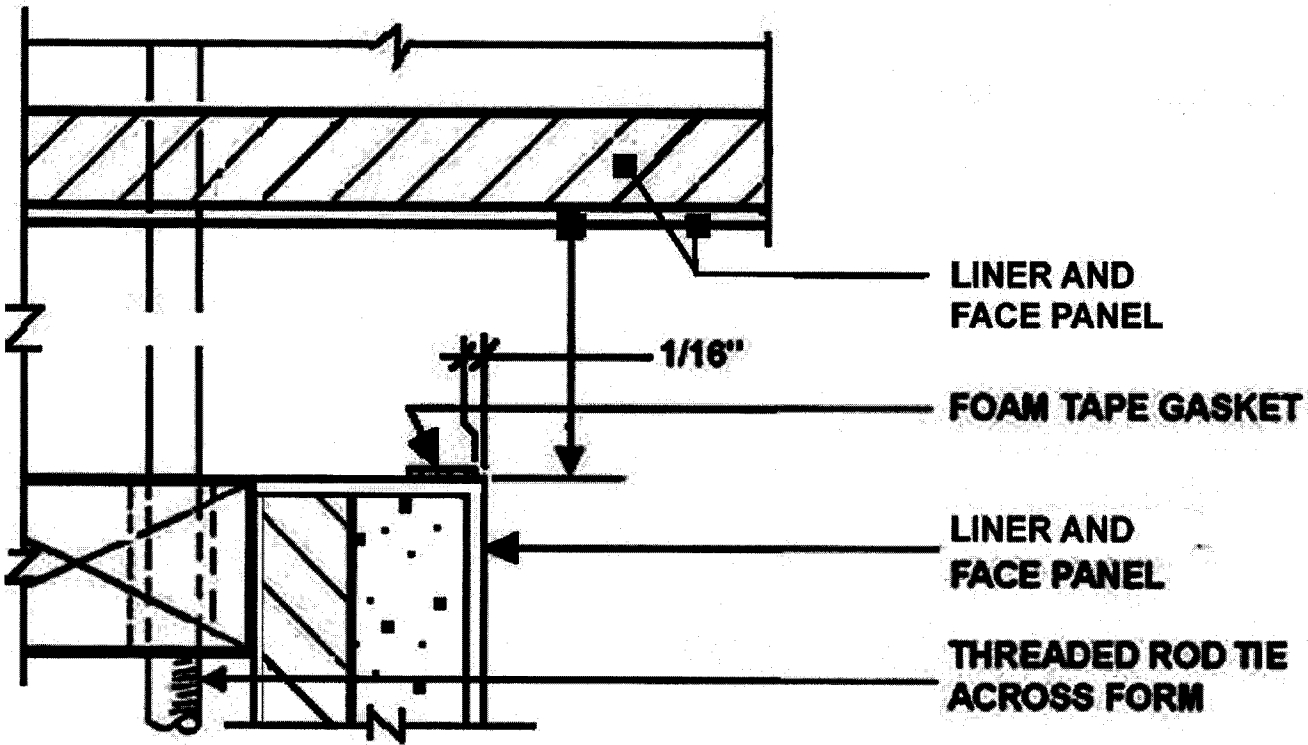


**DETAIL - H1 WALL CORNER
FORM ASSEMBLY**

TYPICAL FORMWORK DETAILS



TYPICAL FORMWORK DETAILS



DETAIL -L CORNER & END FORM LAP & SEAL ASSEMBLY

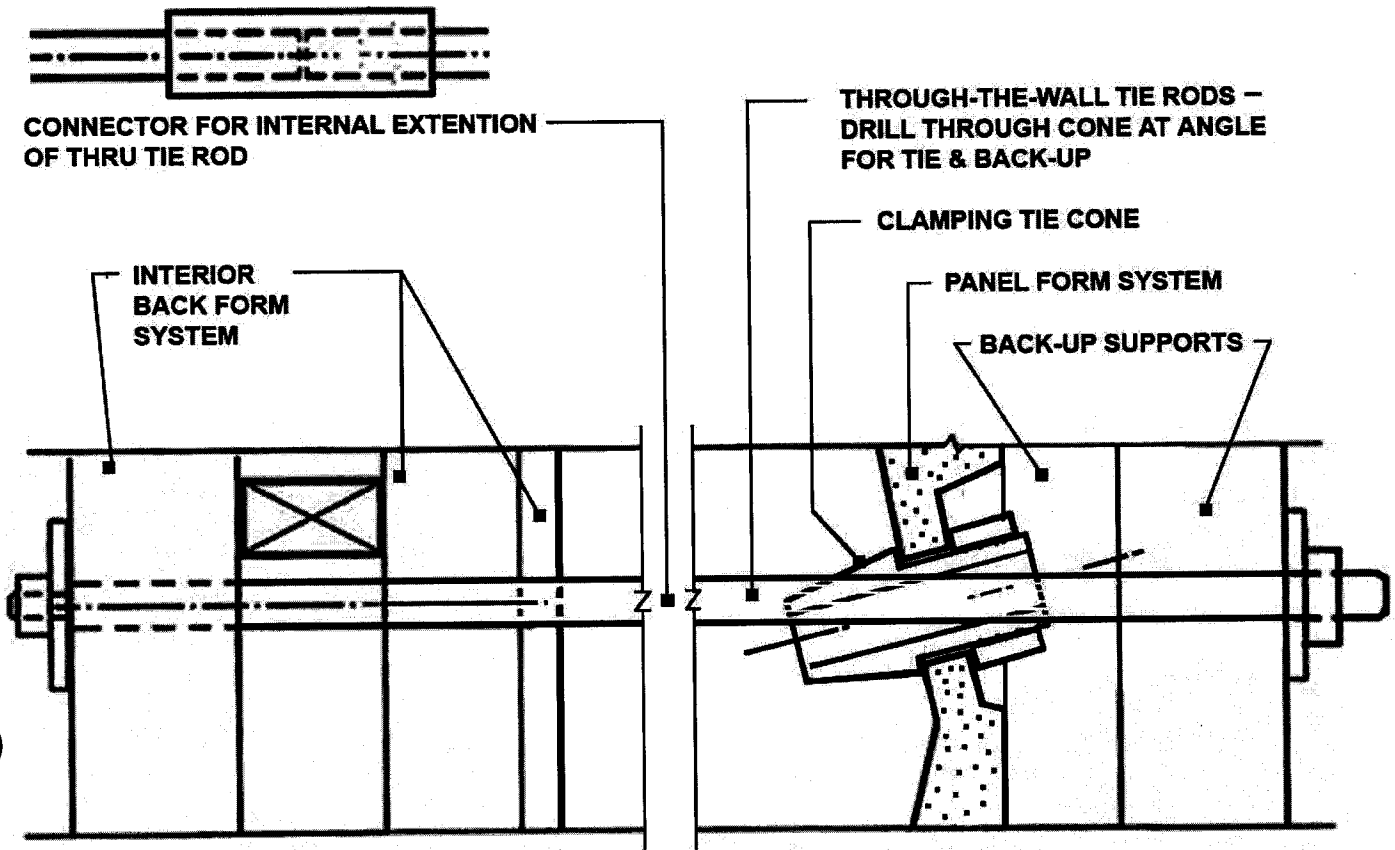
TYPICAL FORMWORK DETAILS



"WHEEL" BAR SUPPORT FOR ARCHITECTURAL SURFACES

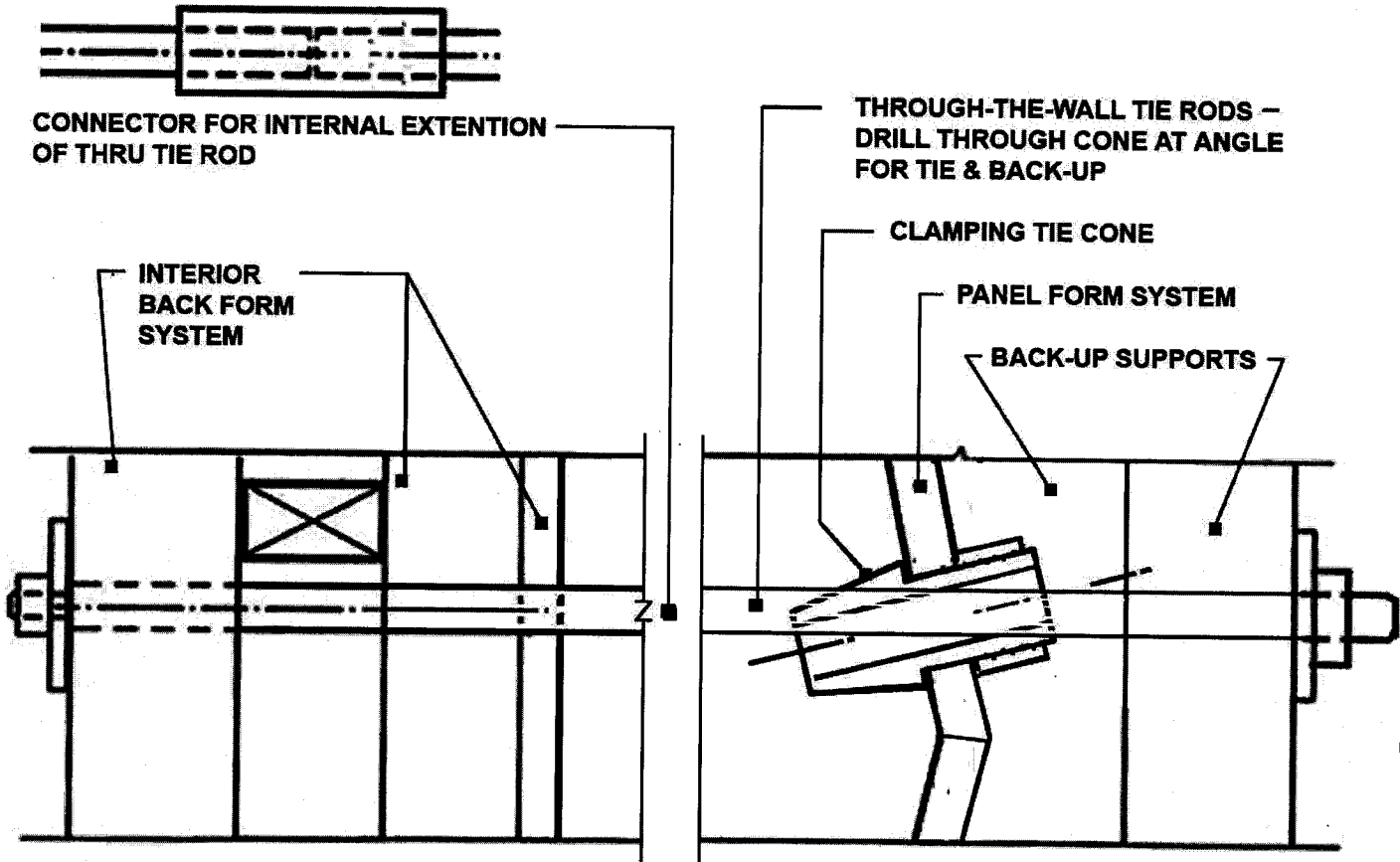
-HEAVY DUTY PLASTIC -

TYPICAL FORMWORK DETAILS



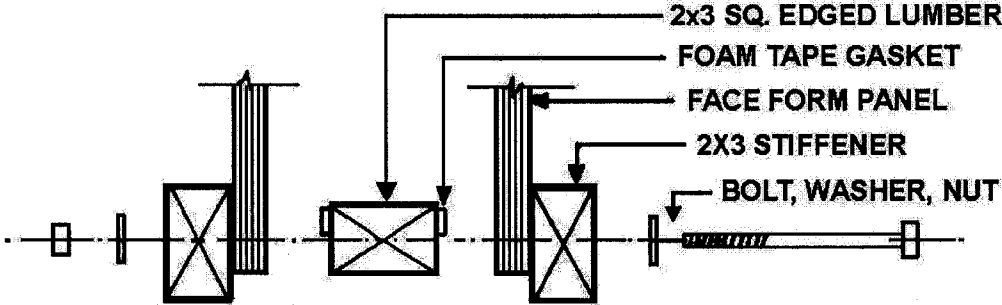
**DETAIL- Na TIE SYSTEM USING FIBERGLASS FORM,
TIE RODS AND CLAMPING TIE CONES**

TYPICAL FORMWORK DETAILS

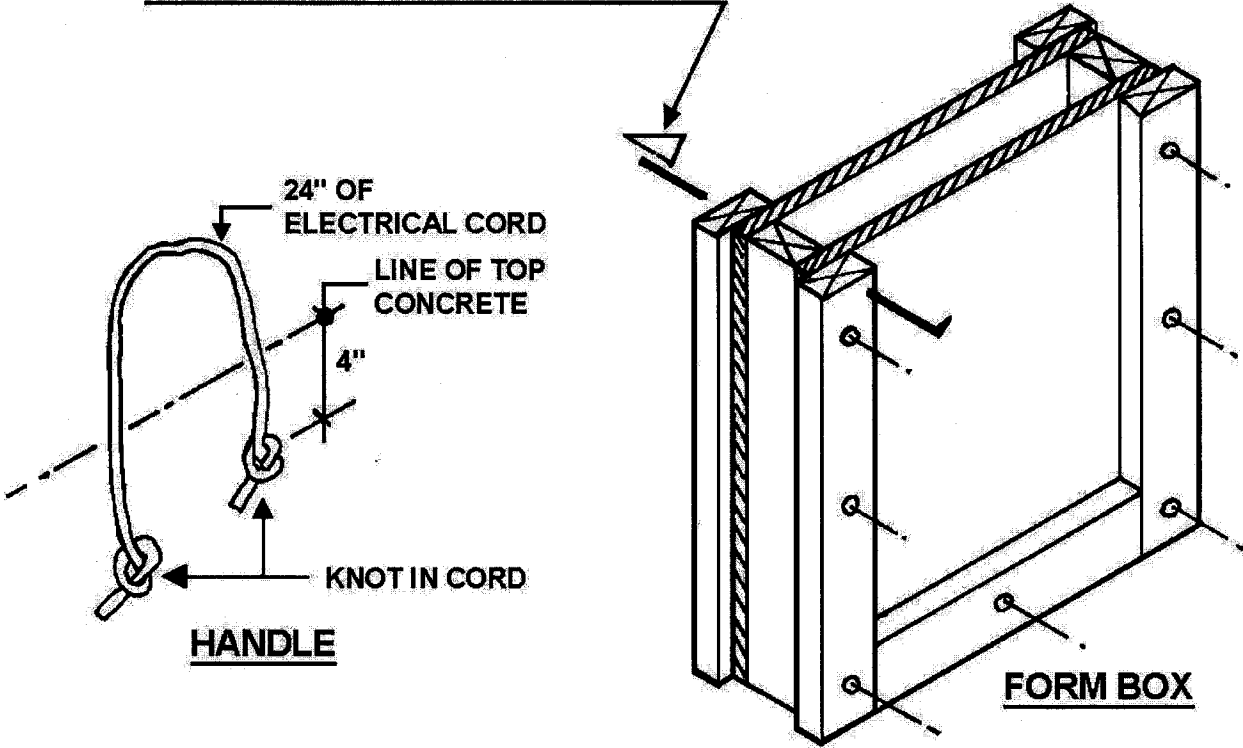


DETAIL- Na TIE SYSTEM USING STANDARD PANELS,
TIE RODS AND CLAMPING TIE CONES

TYPICAL FORMWORK DETAILS



SIDE & BOTTOM ASSEMBLY DETAIL



DETAIL - X SAMPLE BOX FORM

TYPICAL FORMWORK DETAILS

END OF SECTION 03330

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SECTION 03350 – CONCRETE FINISHES

PART 1 - GENERAL

1.1 SUMMARY

- A. The work specified in this Section consists of all materials, labor, and equipment required to provide finishes of all concrete surfaces, complete in place as shown on the Contract Drawings, as specified herein and as required for a complete installation.
- B. This section includes, but is not limited to, the following items:
 - 1. Heavy Duty Shake-on Aggregate Hardener.
 - 2. Finishes on Formed Concrete Surfaces.
 - 3. Slab and Floor Finishes.
- C. Concrete finishes for architectural cast-in-place concrete are not included in this Section but are specified in Section 03330.

1.2 RELATED SPECIFICATIONS

- A. Section 03100 – Concrete Forms and Accessories.
- B. Section 03300 – Cast-in-Place Structural Concrete.
- C. Section 03330 – Architectural Cast-in-Place Concrete.

1.3 REFERENCES

- A. The work covered in this Section shall conform to the latest edition and latest addenda thereto of the following publications to the extent referenced. The publications are referred to in the text by the basic designation only.
 - 1. American Concrete Institute (ACI):
 - a. ACI 117, Standard Specifications for Tolerances for Concrete Construction and Materials.
 - b. ACI 301, Specifications for Structural Concrete for Buildings.
 - c. ACI 302.1, Guide for Concrete Floor and Slab Construction.
 - 2. City of New York
 - a. New York City Building Code, Local Law 76/2008, latest edition and amendments or supplements thereto.
 - b. New York City Board of Standards and Appeals (BS&A), latest edition and amendments or supplements thereto.

1.4 PERFORMANCE REQUIREMENTS

- A. Mock-up for Cast-in-Place Formed Concrete Wall Finish: Conform to the provisions of Section 03330.
- B. Mock-up for Cast-in-Place Concrete Floor Finish: Construct one floor finish mock-up at the project site for the concrete floor inside the Salt Shed building as specified herein and as directed by the Commissioner. Construct the mock-up to be a minimum size of four foot square by 4-inches thick. Concrete shall conform to the applicable material and workmanship requirements of Section 03300 for Class 50 concrete.
- C. The sample mock-ups shall be subject to review and approval by the Commissioner. The approved formed cast floor finish sample mock-ups shall remain at the City's field trailer throughout the duration for which concrete floor finish work is performed. The sample mock-up will be used as a basis for the approval of the in-place concrete floor finishes. Remove the mock-ups from the premises after completion of the work or as directed by the Commissioner.

1.5 SUBMITTALS

- A. Submit the following in accordance with applicable Contract requirements:
 - 1. Product Data: Manufacturer's descriptive product data, current specifications, test results and installation instructions for materials proposed for the work of this Section.
 - 2. Material certifications and technical data sheets.
 - 3. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, and appropriate uses for each product proposed for use.
 - 4. Schedule of floor finishes by room/area designation.

1.6 QUALITY ASSURANCE

- A. All work shall comply with the provisions of the New York City Building Code, Local Law 76/2008, and the rules of the Board of Standards and Appeals, latest edition of each and amendments or supplements thereto.
- B. Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- C. Concrete Floor Finishes: Conform to the designated finish type specified in the Concrete Finish Schedule indicated in Article 3.4 herein. Conform to the applicable provisions of ACI 302.1 - Guide for Concrete Floor and Slab Construction unless more stringent requirements are specified herein.
- D. Floor and Slab Finish Tolerances:
 - 1. Concrete finishes shall meet the following finish tolerance specified herein for each finish type in accordance with the provisions of ACI 117:
 - a. Base slab and slab-on-grade:

- 1) Maximum deviation from profile grade: Plus zero or minus 1/2 inch.
- 2) Maximum deviation for 10-foot steel straightedge: Plus-or-minus 1/8 inch, non-cumulative.
- 3) Verify adequacy of finish for draining by hosing area. Ponding or obstructions to flow toward invert drains constitute defects.

b. Concrete topping or overlay:

- 1) Areas to receive concrete topping or overlay shall conform to contour of finished grades indicated.
- 2) Maximum deviation for 10-foot steel straightedge: Plus 1/8 inch or minus 1/4 inch, non-cumulative.

2. For other measurements and allowable concrete tolerances, see Article 1.5B in Section 03300.

1.7 DELIVERY, STORAGE AND HANDLING

A. General: Failure to comply with the following shall be sufficient cause for rejection of materials by the Commissioner and requiring their removal from the site. Supply new material at no additional expense to the City of New York.

B. Delivery of Materials

1. Deliver materials in manufacturer's original unopened and undamaged containers, with information accurately representing container contents as approved by the Commissioner at time of Shop Drawing submission.
2. Include the following information on the label:
 - a. Name of material and supplier.
 - b. Installation, handling and protection requirements.
3. Deliver materials in sufficient quantities to allow uninterrupted continuity of the work.

C. Storage of Materials

1. Store only approved materials at the project site.
2. Store materials in original, undamaged containers with manufacturer's labels and seals intact.
3. Store all materials in a dry, enclosed area, off the ground and away from all possible contact with water, out of direct sunlight, and in a location where temperature can be constantly maintained between 60°F and 75°F.
4. Prevent damage to materials during storage primarily by minimizing the amount of time they are stored at the job site before being incorporated into the work.

1.8 PROJECT CONDITIONS

A. General: Examine the areas and conditions under which the applied floor finish is to be installed and notify the Commissioner promptly in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until disputed conditions,

discrepancies and/or damages have been corrected, unless otherwise directed by the Commissioner.

- B. Confirm applicability of designated floor finish indicated on Concrete Finish Schedule with manufacturer of approved concrete floor sealer prior to placing concrete. Modify concrete finish as necessary to conform to manufacturer's recommendations and obtain Commissioner's approval prior to placing concrete.

PART 2 - PRODUCTS

2.1 HEAVY DUTY SHAKE-ON AGGREGATE HARDENER

- A. Provide an abrasive, non-slip, non-metallic, dry shake, ready-to-use surface treatment for heavy duty wear and exposure consisting of a dry shake, specially graded mixture of natural mineral aggregates manufactured from aluminum oxide (Corundum), plasticizer and cement binder. Apply to the exposed surfaces of the concrete topping overlay inside the Salt Shed building. Concrete slab to receive floor hardener shall have a maximum total air content of 3.0 percent and a concrete slump as specified in Section 03300. Application and coverage rate shall conform to manufacturer's written instructions.
- B. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - 1. A-H Emery, Anti-Hydro International, Inc., Flemington, NJ
 - 2. Emerytop 400, L&M Construction Chemicals, Inc., Omaha, NE
 - 3. Surfex, Euclid Chemical Company, Cleveland, OH.
 - 4. Or approved equal.
- C. Engage the services of the manufacturer's field service representative to supervise the application of the floor surface hardener. The field service representative shall witness the initial placement of concrete and floor surface hardener and make a minimum of one additional site visit to ensure correct placement of the floor surface hardener.
- D. Conduct a pre-construction conference prior to initial concrete placement with the manufacturer's field service representative, the Commissioner and the Contractor's superintendent and concrete finisher foreman, who is actually performing the concrete placement and finishing work, to define critical times and procedures to be used in placement of floor surface hardener.
- E. Submit a technical service report for each site visit made during placement of floor surface hardener. Include all pertinent information related to the concrete and hardener placement. Submit the technical service report in triplicate within seven calendar days after concrete placement with copies distributed to the Commissioner and the Contractor.

PART 3 - EXECUTION

3.1 FINISHES ON FORMED CONCRETE SURFACES

A. Construct formed structural concrete in conformance with Sections 03300 and 03330. After removal of forms, apply the finishes described below in accordance with the Concrete Finish Schedule presented herein. All formed surfaces shall receive at least a Type I finish unless specified or indicated otherwise. All exterior formed concrete surfaces of the Salt Shed building exposed to public view shall conform to the applicable requirements of Section 03330. The Commissioner shall be the sole judge of applicability and acceptability of all formed concrete finish work.

1. Type I - Rough or Board Form Finish: Remove all fins, burrs and other projections left by formwork removal in accordance with the provisions of Section 03100. Fill solid all holes left by removal of ties, and all other holes, depressions, or voids with cement grout after first being thoroughly wetted. Chip back honeycombs to solid concrete, as directed by the Commissioner, prior to patching with cement grout. Fill holes with a small tool that will permit packing the hole solidly with cement grout. Cement grout shall consist of one part cement to three parts sand, and the amount of mixing water shall be as little as consistent with the requirements of handling and placing. Color of cement grout shall closely match the adjacent wall surface. Thoroughly clean the surface of all stains or discolorations that will interfere or be incongruous with the final finish.
2. Type II - Smooth Form Finish: Concrete shall be cast against forms constructed of plywood not less than 5/8-inch thick, or of boards lined with tempered hardboard not less than 3/16-inch thick, or other approved materials in accordance with the provisions of Section 03100 and as specified herein. Do not use form material that has raised grain, torn surfaces, worn edges, dents, patches of holes from previous use, other defects that would impair the texture, appearance or durability of the concrete surface, or that is not acceptable to the Commissioner. Utilize form material sheets as large as practicable in an orderly and symmetrical configuration and keep seams to a practical minimum. Other aspects of the finish shall conform to the requirements of Type I finish.
3. Type III - Grout Cleaned Finish: Where this finish is required, it shall be applied after completion of Type II finish. After the formwork is removed and the concrete has been pre-dampened, mix and spread a slurry consisting of one part cement to 1-1/2 parts sand passing the No. 30 sieve, by damp loose volume, over the surface with clean burlap pads or sponge rubber floats and scrubbed into the surface using a rotary motion. Include an appropriate quantity of white cement in the slurry mixture to produce a color closely matching the surrounding concrete. Remove any surplus material by scraping and then rubbing with clean burlap. Keep the finish damp for at least 36 hours after application.
4. Type IV - Smooth Rubbed Finish: Where this finish is required, it shall be applied after the completion of the Type II finish, and no later than one day following form removal. Do not commence rubbing before the concrete is thoroughly hardened and the mortar used for patching is firmly set. Obtain a smooth, uniform surface by wetting the concrete surface and rubbing it with a carborundum stone to eliminate irregularities. Unless the nature of the irregularities requires it, avoid cutting into the general surface of the concrete. Corners and edges shall be slightly rounded by the use of the carborundum stone. Brush finishing or painting with grout or neat cement will not be permitted.

3.2 SLAB AND FLOOR FINISHES

A. General:

1. The concrete finishes described below shall be applied to floors, slabs, sidewalks, toppings, and tops of formed walls in accordance with ACI 301 and the Concrete Finish Schedule presented herein.
2. Test for finish flatness within 24 hours of final troweling in accordance with the tolerances specified herein. The Commissioner shall review and approve the applicability of the required concrete finish for a given area. The Commissioner shall be the sole judge of acceptability of all such concrete finish work.

B. Finishes on Slab and Floor Surfaces:

1. Type "A" – Screeded Finish: Place, consolidate by placing screeds at frequent intervals, and immediately strike off concrete to obtain proper contour, grade, and elevation before bleed water appears. Permit concrete to attain a set sufficient for floating and supporting the weight of the finisher and equipment. If bleed water is present prior to floating the surface, drag excess water off or remove by absorption with porous materials. Do not use dry cement to absorb bleed water. Produce a finish that will meet a minimum overall flatness tolerance of F_F15 conventional bullfloated finish in accordance with ACI 117.
2. Type "C" – Floated Finish: Following completion of Type "A" finish, do not work the concrete further until the surface is ready for floating. Begin floating with a hand float, a bladed power float equipped with float shoes, a powered disc float highway straightedge as soon as the water sheen had disappeared and the surface has stiffened sufficiently to permit the operation. During or after the first floating, check flatness of surface with a 10-foot straightedge applied in two or more directions. Eliminate high spots and low spots during this procedure to produce a conventional, straightedge finish, then refloat the slab immediately to a uniform sandy texture. Repeat as necessary to produce a minimum F_F20 conventional straight-edged finish tolerance in accordance with ACI 117.
3. Type "D" - Hard Steel Troweled Finish: Following completion of a Type "C" finish and sufficient hardening of the concrete to prevent excess fine material from working to the surface, compact and smooth the surface with a power trowel. Following the power trowel, hand trowel to provide a smooth, dense surface, free from defects, trowel marks, and blemishes. For surfaces exposed to wear, continue hand troweling until a ringing sound is produced as the floor is troweled to provide a hard steel trowel finish.
4. Type "E" - Magnesium Troweled Finish: Following completion of a Type "C" finish and sufficient hardening of the concrete to prevent excess fine material from working to the surface, compact and smooth the surface with a power trowel. Following the power trowel, hand trowel to provide a smooth, dense surface, free from defects and blemishes. For surfaces requiring a non-slip finish, continue hand troweling with a magnesium surface trowel to produce a slightly swirled pattern.
5. Type "F" - Broom Finish: This finish shall provide the surface with a transverse scored texture by drawing a broom across the surface immediately after completion of a Type "C" finish. Apply transverse broom finish perpendicular to direction of travel. Amplitude of broom finish shall be approximately 1/8 inch.
6. Type "G" – Heavy-duty Shake-on Aggregate Hardener: Provide broadcast-applied hardener finish by applying a specially graded, non-metallic, natural mineral aggregate concurrently with the application of a hard burnished, power troweled, Type "D" hard

steel trowel finish with a minimum F_{25} flat finish tolerance in accordance with ACI 117. Apply hardener in strict accordance with the manufacturer's instructions.

3.3 FINISHES ON EQUIPMENT PADS

- A. Formed surfaces of equipment pads shall receive a Type II finish.
- B. Top surfaces of equipment pads, except those surfaces subsequently required to receive non-shrink grout and support equipment bases, shall receive a Type "D" finish, unless otherwise noted.
- C. Surfaces which will later receive non-shrink grout shall, before the concrete takes its final set, shall be made rough by removing the sand and cement that accumulates on the top to the extent that the aggregate will be exposed with irregular indentations in the surface up to 1/2-inch deep.

3.4 CONCRETE FINISH SCHEDULE

Item	Finish Type
Concrete surfaces not exposed to public view including utility spaces	I
Surfaces to be painted	III
Exterior vertical surfaces exposed to view	IV
Interior vertical surfaces not exposed to public view	IV
Other architectural finishes	V, VI or VII as indicated or described in the Contract Documents
Surfaces to receive bonded cementitious mixtures, overlays or integral toppings	B
Surfaces to receive roofing insulation	D
Exterior sidewalks	E
Driveways and apron slabs	F
Concrete floor surface within interior of Salt Shed building	G

END OF SECTION 03350

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SECTION 03411 - PRECAST CONCRETE HOLLOW CORE PLANKS

PART 1 - GENERAL

1.1 SUMMARY

- A. The work specified in this Section consists of providing all labor, materials, equipment, services and incidentals necessary to furnish and install precast concrete hollow core planks complete in place as indicated on the Contract Drawings, as specified herein and as required for a complete installation in all respects.
- B. This Section includes, but is not limited to, the following items:
 - 1. Precast roof planks.
 - 2. Connection plates with brackets and hangers, steel headers.
 - 3. Grouting plank joint keys.
- C. The work includes all incidental and miscellaneous items not specified under another Section but required for the work of this Section, whether or not specifically referred to herein.

1.2 RELATED SPECIFICATIONS

- A. Section 03200 - Concrete Reinforcement.
- B. Section 03300 - Cast-in-Place Structural Concrete.
- C. Section 05120 - Structural Steel.
- D. Section 09960 - High Performance Coating.

1.3 REFERENCES

- A. The work covered in this Section shall conform to the latest edition and latest addenda thereto of the following publications to the extent referenced. The publications are referred to in the text by the basic designation only.
 - 1. American Concrete Institute (ACI)
 - a. ACI 301 - Structural Concrete for Buildings; American Concrete Institute International.
 - b. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.
 - 2. American Society for Testing and Materials (ASTM):
 - a. ASTM A36/A36M - Carbon Structural Steel.
 - b. ASTM A153/A153M - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - c. ASTM A615/A615M - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

- d. ASTM A780 - Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - e. ASTM C881 - Epoxy-Resin-Base Bonding Systems for Concrete.
3. American Welding Society (AWS)
- a. AWS B2.1 - Specification for Welding Procedure and Performance Qualification; American Welding Society.
 - b. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.
 - c. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; American Welding Society.
4. Prestressed Concrete Institute (PCI)
- a. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products; Precast/Prestressed Concrete Institute; 1999, Fourth Edition.
 - b. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; Precast/Prestressed Concrete Institute; Sixth Edition, 2004.
 - c. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete; Precast/Prestressed Concrete Institute; 1988, Second Edition.
 - d. PCI MNL-126 - Manual For The Design of Hollow Core Slabs; Precast/Prestressed Concrete Institute; 1998.
 - e. PCI MNL-135 - Tolerance Manual For Precast and Prestressed Concrete Construction; Precast/Prestressed Concrete Institute; 2000.
5. International Code Council: International Building Code (IBC); 2009.
6. New York State Department of Transportation (NYSDOT):
- a. NYSDOT Standard Specification - Construction and Materials.
7. City of New York:
- a. New York City Building Code, Local Law No. 76/2008, latest edition and amendments or supplements thereto.
 - b. New York City Board of Standards and Appeals, latest edition and amendments or supplements thereto.

1.4 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Design planks in accordance with the requirements of MSBC, PCI MNL-120, PCI MNL 126, ACI 318, and ACI 301. Planks shall be designed as Class "U" (uncracked) in conformance with ACI 318-08, Section 18.3.3 requirements.
- B. Design connections in accordance with PCI MNL-123.
- C. Design components to withstand dead loads and design loads in the configuration indicated on the drawings and as follows:
 - 1. Maximum Allowable LL Deflection of Roof Planks: 1/240 span.

2. Maximum Net Downward Deflection of Roof Planks: 3/8" including all imposed loads plus long-term creep.
3. Design components to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.
4. Design loadings shall include initial handling and erection conditions and all dead and live loads specified on the contract documents including partition weights given on the drawings. Precast supplier shall review architectural and structural drawings to verify adequacy of precast members supporting partitions and other non-structural elements near openings, at edges, etc.
5. Grouted Keys: Capable of transmitting horizontal shear force of 2,000 lb/ft.

D. Plank design shall include cast-in-place topping overlay as composite structural topping.

1.5 SUBMITTALS

A. Submit the following in accordance with applicable Contract requirements:

1. Shop Drawings: Indicate plank locations, unit identification marks, connection details, edge conditions, bearing requirements, support conditions, dimensions, openings, openings intended to be field cut, and relationship to adjacent materials.
2. Erection drawings: Include member piece marks with size and shape of each member; plans/elevations showing all products furnished by supplier; sections/details showing connections and cast in items; joints and openings between members and structure; description of all loose cast-in field hardware; locations of field installed anchors, fire ratings of all members; and all dead, live and other applicable design loads. Include anticipated camber and deflection of precast members where camber or deflection exceeds $L/360$ or $1/2"$, and where camber and deflection vary more than $1/4"$ between adjacent units.
3. Production drawings on request. Include elevation view of each member, sections/details to show quantity and position of reinforcing, anchors, and inserts, handling devices, dimensions and finishes, strand prestress, concrete strength, and estimated camber.
4. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
5. Design Calculations
 - a. Submit calculations for headers and connections.
 - b. Submit calculations for planks.
 - c. Review of calculations will be for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. The Contractor shall be responsible for correctness and completeness of submitted calculations. Plank design shall include plank cut-offs and openings and extra reinforcement for planks adjacent to cut-off planks to support the specified design loads shown on the Contract Drawings.
 - d. Calculations to be certified by a licensed Professional Engineer registered in the State of New York.
6. Sufficient evidence that all persons performing shop and field welding are currently certified by AWS for the procedures they are performing.
7. Precast plant certification.

1.6 QUALITY ASSURANCE

- A. The precast concrete manufacturing plant shall be certified by the Precast/Prestressed Concrete Institute, Plant Certification Program, in categories C2 or C2A at the time of bidding.
- B. Designer Qualifications: Under direct supervision of a licensed Professional Engineer registered in the State of New York and experienced in design of this Work.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- D. Erector Qualifications: Company specializing in performing the type of work specified in this section, with a minimum of three years of documented experience.
- E. Welder Qualifications: Qualified within previous 12 months in accordance with AWS B2.1.

1.7 PRE-INSTALLATION MEETING

- A. Convene at least one week before starting work of this Section.
- B. Discuss anchor and weld plate locations, sleeve locations, and cautions regarding cutting or core drilling.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.
- B. Storage:
 - 1. Store all units off ground. Place stored units so that identification marks are discernible.
 - 2. Separate stacked members by battens across full width of each bearing point.
 - 3. Stack so that lifting devices are accessible and undamaged. Do not use upper member of stacked tier as storage area for shorter member or heavy equipment.

1.9 PROJECT CONDITIONS

- A. Coordinate with framing components directly associated with the work of this section.
- B. Coordinate field cut openings with affected section.
- C. Coordinate location of hanger tabs and devices for mechanical and electrical work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Materials: As specified in Section 03300. Minimum concrete compressive strength f'_c shall be 6,000 psi at 28 days. Concrete shall include corrosion inhibitor admixture as specified herein.
- B. Tensioning Steel Tendons: ASTM A416/A416M, Grade 250, Grade 270; seven-wire stranded steel cable; stress relieved, or low-relaxation type; full length without splices; uncoated.
- C. Reinforcing Steel: ASTM A615/A615M Grade 60 deformed steel bars.
- D. Cement Grout: Minimum compressive strength of 3,500 psi at 28 days. Cement grout shall be minimum of one part portland cement (ASTM C150, Type I) and two parts sand (ASTM C144 or C404) with minimum water for placement and hydration to achieve its required strength.
- E. Epoxy-Resin Grout: Two components mineral-filled epoxy-resin: ASTM C88.
- F. Concrete Topping Overlay: As specified in Section 03300. Minimum compressive strength shall be 5,000 psi.
- G. Corrosion Inhibiter Admixture:
 - 1. Provide corrosion inhibiting admixture containing a minimum of 30 percent calcium nitrite by mass, conforming to the requirements of Section 711-13 of the NYSDOT Standard Specifications.
 - 2. Dosage shall be 3.0 gallons per cubic yard. The quantity of mix water shall be adjusted to account for the water portion of the calcium nitrite solution. Water content of corrosion inhibitor shall be considered as 7.3 pounds per gallon in computing the water/cement ratio of the overall mix.
 - 3. Retarding admixtures shall be provided as needed, since the calcium nitrite solution accelerates setting time, unless the admixture has been specifically formulated to not accelerate setting.
 - 4. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. DCI or DCI-S; Grace Construction Products, Cambridge, MA
 - b. Rheocrete CNI; Master Builders, Inc., Cleveland, OH
 - c. Anti-Hydro NC; Anti-Hydro International, Inc., Flemington, NJ
 - d. Eucon CIA; Euclid Chemical Company, Cleveland, OH
 - e. Or approved equal.

2.2 ACCESSORIES

- A. Connecting and Supporting Devices: Plates, angles, items connected to steel framing members, and inserts: ASTM A36/A36M carbon steel; hot-dip galvanized in accordance with ASTM A153/A153M.

- B. Bearing Pads: High density plastic, 1/8 inch thick, smooth on both sides. Korolath type or approved equal.

2.3 FABRICATION

- A. Planks: Plant cast, prestressed, hollow core.

- 1. Dimensions as indicated on drawings.

- B. Manufacture in general compliance with PCI MNL 116

- C. Weld reinforcing in accordance with AWS D1.4. Provide AWS certified welders for all shop welding.

- D. Embed anchors, inserts, plates, angles, and other items at locations indicated.

- E. Provide openings required by other sections, at locations indicated. Provide openings larger than 8" square or 8" round.

- F. Cut exposed ends flush.

- G. Plant Finish: PCI MNL-116.

- 1. Roof Members: Grade A bottom surfaces of planks.

- H. Connecting and Supporting Steel Devices: Do not paint surfaces in contact with concrete or surfaces requiring field welding.

- I. Accurately place prestressing strands and reinforcing steel. Keep strands or wires clean of substances harmful to bonding of strand to concrete.

- J. Provide and fabricate structural steel headers as needed for plank openings

2.4 FABRICATION TOLERANCES

- A. Conform to PCI MNL-116 and PCI MNL-135.

2.5 SOURCE QUALITY CONTROL

- A. Refer to Section 03300 for testing of concrete and grout, materials, and mix designs.

- B. Produce planks in accordance with requirements of PCI MNL-116. Maintain plant records and quality control program during production of precast planks. Make records available upon request.

- C. Inspect stressing tendons before delivery for compliance with specified standards.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify supporting structure is ready to receive work including all bearing surfaces and location and alignment of inserts and anchorage items cast in the structure.
- B. Notify the Contractor in writing of required corrections, if unsatisfactory conditions or deficiencies are observed. Do not begin work until corrections are made.

3.2 PREPARATION

- A. Prepare support devices for the erection procedure and temporary bracing.

3.3 ERECTION

- A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.
- B. Install bearing pads at bearing ends of planks.
- C. Align and maintain uniform horizontal and end joints, as erection progresses.
- D. Maintain temporary bracing in place until final connection is made. Protect members from staining.
- E. Adjust differential camber between precast members to tolerance before final attachment and grouting.
- F. Adjust differential elevation between precast members to tolerance before final attachment, as work progresses.
- G. Secure units in place as work progresses. Perform welding in accordance with AWS D1.1.
- H. Repair damaged galvanized members with procedures and products from ASTM A780.
- I. Cooperate with other trades in permitting insertion of anchors, hangers, electrical outlets, etc.
- J. Install steel headers as indicated on the Contract Drawings or required for openings.
- K. Prior to placing concrete topping overlay, thoroughly clean surface removing all dirt and excess laitance, saturate the precast surfaces, remove excess water, and slush with a neat cement grout immediately before placing new concrete. Refer to Section 03300 for surface preparation, placement, finishing and curing of concrete topping overlay.

3.4 GROUT

- A. Grout all keyways full and strike off flush with top surface. Before it hardens, remove any grout that seeps to bottom of plank.

- B. Make plank-to-plank joints smooth using grout, troweled smooth. Transition differential elevation of adjoining planks with grout to a maximum slope of 1:12.
- C. Grout cores of plank as required for anchorage of structural steel, elevator supports and miscellaneous metal items as shown on drawings.
- D. Place grout at temperatures above 32°F (and rising). Maintain grout above freezing until it reaches its design strength.
- E. Grout may be placed at temperatures below 32°F if special precautions are taken to prevent grout from freezing prior to its initial set, to limit grout to a single freeze thaw cycle, and to maintain heat, once applied, until the grout reaches its design strength. Do not load plank under these conditions until grout reaches its design strength. Provide outline of procedures to be used and obtain approval

3.5 TOLERANCES

- A. Erect members level and plumb within allowable tolerances. Conform to non-cumulative tolerances of PCI MNL-135.

3.6 FIELD OPENINGS AND ANCHORS BY OTHER TRADES

- A. Field cut openings smaller than 8" in all directions using power saws or core drills. Receive written approval of opening locations by the precast prestressed manufacturer and Commissioner before cutting. Repair all unsightly spalls or chips caused by cutting.
- B. Receive approval of type and location of field installed fasteners from precast prestressed manufacturer and the Commissioner. Anchors shall not contact prestressing steel.

3.7 PROTECTION

- A. Protect members from damage caused by field welding or erection operations.
- B. Provide non-combustible shields during welding operations.
- C. Protect cores of plank from collection of water during construction, and drain any moisture that accumulates.

3.8 CLEANING

- A. Clean weld marks, dirt, and blemishes from surface of exposed members.
- B. Clean and prime exposed steel and welds immediately after erection.

3.9 PAINTING

- A. Prepare and paint bottom surfaces of precast roof planks in accordance with provisions of Section 09960.

3.10 FIELD QUALITY CONTROL

A. Structural Testing and Special Inspection

1. Comply with the requirements of Section 05120.
2. The City of New York will employ a Special Inspector for the following:
 - a. Visually inspect welds connecting embeds to structural steel supporting members.
 - b. Visually inspect welds at all connections between precast members.

END OF SECTION 03411

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SECTION 05120 – STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SUMMARY

- A. The work specified in this Section consists of all labor, materials, equipment and services necessary to furnish, fabricate, shop paint and erect structural steel and appurtenances in accordance with the extent of work and the details indicated on the Contract Drawings, as specified herein and as required for a complete installation in accordance with Contract requirements.
- B. Structural steel, as referenced herein, is that work defined in the AISC Code of Standard Practice and as otherwise shown on the Contract Drawings, including stiffeners, plates, bars, fasteners, sag and hanger rods, and other miscellaneous metal required for a complete installation.
- C. This Section includes structural steel shapes, plates, bars and fasteners required for the fabrication and erection of miscellaneous structure supports, structure reinforcements, equipment supports and non-framing steel fabrications affecting structural steel.
- D. This Section includes provisions for surface preparation and protective coating of structural and miscellaneous steel components, including galvanizing and shop applied prime painting, to the extent described herein and as shown or indicated on the Contract Drawings.
- E. The work includes all incidental and miscellaneous items not specified under another Section but required for the work of this Section, whether or not specifically referred to herein.
- F. This Section includes, but is not limited to, the following items:
 - 1. Carbon Structural Steel.
 - 2. Structural Steel Plates, Shapes and Bars.
 - 3. Structural Steel Tubing and Pipe.
 - 4. Steel Armor Plate.
 - 5. Anchor Bolts, Nuts and Washers.
 - 6. High Strength Carbon Fasteners: Bolts, Nuts and Washers.
 - 7. Galvanized Steel Fasteners: Bolts, Nuts and Washers.
 - 8. Headed Anchors (Welded Shear Studs)
 - 9. Welding Electrodes.
 - 10. Chemical Adhesive Anchors.
 - 11. Mechanical Expansion Anchors.
 - 12. Protective Coatings, Shop Applied.
 - 13. Galvanizing Repair Paint.

1.2 RELATED SPECIFICATIONS

- A. Section 03300 – Cast-in-Place Structural Concrete.
- B. Section 09960 – High Performance Coating.

1.3 REFERENCES

A. The work covered in this Section shall conform to the latest edition and latest addenda thereto of the following publications to the extent referenced. The publications are referred to in the text by the basic designation only.

1. American Institute of Steel Construction (AISC):
 - a. AISC Manual of Steel Construction, Specification for Structural Steel Buildings, Allowable Stress Design with Commentary and Supplements, 13th Edition.
 - b. AISC Code of Standard Practice for Steel Building and Bridges, with Commentary.
 - c. AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts with Commentary.
 - d. AISC Detailing for Steel Structures.
2. American National Standards Institute (ANSI):
 - a. ANSI B18.2.1, Square and Hex Bolts.
 - b. ANSI B18.2.2, Square and Hex Head Nuts.
 - c. ANSI B18.22.1, Plain Washers.
3. American Society for Testing and Materials (ASTM):
 - a. ASTM A6, General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use.
 - b. ASTM A36, Carbon Structural Steel.
 - c. ASTM A53, Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - d. ASTM A123, Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - e. ASTM A153, Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - f. ASTM A167, Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - g. ASTM A276, Stainless Steel Bars and Shapes.
 - h. ASTM A307, Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - i. ASTM A325, High-Strength Bolts for Structural Steel Joints.
 - j. ASTM A490, Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
 - k. ASTM A500, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - l. ASTM A563, Carbon and Alloy Steel Nuts.
 - m. ASTM A572, High-Strength, Low-Alloy Columbium-Vanadium Structural Steel.
 - n. ASTM A588/A588M, High-Strength Low-Alloy Structural Steel, up to 50 ksi Minimum Yield Point, with Atmospheric Corrosion Resistance.
 - o. ASTM A992, Steel for Structural Shapes for Use in Building Framing.
 - p. ASTM F436, Hardened Steel Washers.
 - q. ASTM F593, Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - r. ASTM F594, Stainless Steel Nuts.
 - s. ASTM F1554, Anchor Bolts, Steel, 36, 55 and 105-Ksi Yield Strength.

4. American National Standards Institute/American Welding Society (ANSI/AWS):
 - a. ANSI/AWS D1.1/D1.1M, Structural Welding Code - Steel.
5. International Code Council: International Building Code (IBC), 2009 Edition, for post-installed steel anchors in hardened concrete.
6. City of New York Building Code, Local Law No. 76, latest edition and amendments or supplements thereto.
7. City of New York Board of Standards and Appeals, latest edition and amendments or supplements thereto.
8. Society for Protective Coatings (SSPC), formerly Steel Structures Painting Council:
 - a. SSPC-SP 1, Solvent Cleaning.
 - b. SSPC-SP 3, Power Tool Cleaning.
 - c. SSPC-SP 6, Commercial Blast Cleaning.

1.4 SUBMITTALS

A. Submit the following in accordance with applicable Contract requirements:

1. Shop Drawings that depict all shop and erection layouts, details and schedules for fabrication and shop assembly of structural steel members including grade of steel; structural shapes, sizes and dimensions; welding technique and sequence, cuts, copes, gussets and all other members, connections, holes, fasteners, anchor bolts and setting plans; camber, fabrication and erection tolerances; surface preparation, type of primer paint system and other coatings, weights of members, and critical clearances. Indicate all surface finishes and welds both shop and field, by symbols conforming to ANSI/AWS Standards. Show relationship between structural steel, concrete, masonry and other materials and embedded items.
2. Design Calculations: Submit for review structural design calculations of all steel connections for which connection details or beam reaction values are not shown on the Contract Drawings. Calculations shall be prepared under the direct supervision of, and signed and sealed by, a licensed Professional Engineer registered in the State of New York and experienced in the structural design of structural steel connections.
3. Working Drawings that depict design and details of all required temporary supports, staying and bracing and shall include descriptive data, including design calculations, to illustrate the erection, transportation, and handling procedures including sequence of erecting and transfer of loads, if applicable.
4. Setting diagrams, templates, and directions for the installation of structural framing, anchor bolts, bearing plates, and other embedded items.
5. Do not commence shop fabrication until Shop Drawings and Working Drawings applicable to that portion of work have been reviewed and approved in writing by the Commissioner.
6. AISC Quality Certification Certificates, currently applicable, for steel fabricator and erector.
7. Welding Records and Data:
 - a. Procedure for pre-qualifying welders and welding procedures. For procedures other than those set forth in Paragraph 5.1 of ANSI/AWS D1.1/D1.1M, submit a copy of procedure qualification test records.

- b. Certified copy of qualification test record for each welder, welding operator, and tacker who will be employed in the work, whether in the fabrication shop or in the field. All welders performing work within the City of New York limits shall be certified by the City of New York in accordance with the latest rules of the City of New York Board of Standards and Appeals and the current provisions of the City of New York Building Code. All other welders shall be certified in accordance with ANSI/AWS D1.1/D1.1M, Structural Welding Code, Steel.
 - c. Descriptive data for field welding equipment, including type and electrical power requirements.
 - d. Test results of all non-destructive testing performed on field welds.
- 8. **Manufacturer's Data:** Submit manufacturer's specifications, test reports and installation instructions for all proposed materials, products and accessories.
 - 9. Notarized certificates of compliance for materials and products or certified copy of reports for analyses and tests required by referenced ASTM Specifications, including but limited to the following:
 - a. Certified mill test reports
 - b. Affidavit of compliance with steel grade specified
 - c. Test reports for filler metals for welding
 - d. Mechanical test for high strength threaded fasteners
 - e. Paint certification.
 - 10. Submit project-specific safety precautions proposed to prevent falls and provide fall protection during handling and erection of structural steel.
- B. Review of Shop Drawings and Working Drawings will be for general considerations and design intent only. Compliance with specified requirements for materials, fabrication and erection of structural steel shall be the Contractor's responsibility.

1.5 QUALITY ASSURANCE

- A. All work shall comply with the provisions of the Building Code of the City of New York, Local Law No. 76, and the Board of Standards and Appeals, latest edition of each and amendments or supplements thereto. Work of this Section shall conform to all applicable Federal, State and local laws and regulations.
- B. **Fabricator Qualifications:** The steel fabricator shall be certified through the AISC Certification Program and designated as an AISC Certified Plant, Category STD.
- C. **Erector Qualifications:** The steel erector shall be a qualified installer who has participated in the AISC Certification Program and is designated as an AISC Certified Erector, Category CSE.
- D. Design of details not otherwise indicated, and fabrication, assembly, and inspection of steel structures shall conform to the following applicable specifications, codes and publications, latest issue, except as modified herein:
 - 1. AISC Manual of Steel Construction, Allowable Stress Design, including the following:

- a. Specification for Structural Steel Buildings, Allowable Stress Design, with Commentary, AISC.
 - b. Code of Standard Practice for Steel Buildings and Bridges, with Commentary, AISC.
 - c. Specification for Structural Joints Using ASTM A325 or A490 Bolts, with Commentary, Research Council on Structural Connections, endorsed by AISC.
2. Structural Welding Code - Steel, ANSI/AWS D1.1/D1.1M.
 3. Detailing for Structural Steel, AISC.

E. Structural Steel Connections:

1. Design of structural steel connections for steel framing for which connection details or beam reaction values are not shown on the Contract Drawings shall be performed under the direct supervision of a licensed Professional Engineer registered in the State of New York and experienced in the structural design of structural steel connections.
2. Provide details of connections required by the Contract Documents to be selected or completed by structural steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.
3. Select and complete connections using schematic details indicated and AISC Steel Construction Manual, Allowable Stress Design.
4. Engineering Responsibility: Fabricator's responsibilities include using a qualified licensed Professional Engineer currently registered in the State of New York to prepare structural analysis data for structural steel connections for steel structures.

F. Testing and Inspection

1. All welding operations and tensioning of high strength bolts shall be subject to special inspection in accordance with the requirements of the City of New York Building Code and applicable Contract requirements.
2. Special inspection and testing services required by the City of New York Building Code will be provided by the Commissioner. Failure of a special inspection to detect a defect in materials or workmanship shall not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
3. The Commissioner will inspect all field-assembled bolted construction in accordance with Section 9 of the "Specification for Structural Joints Using ASTM A325 or A490 Bolts." The Commissioner may verify the tightening of bolts by visual verification of the load indicator washer, by use of a direct tension indicator, or by using an inspection wrench in accordance with Section 9 of the "Specification for Structural Joints Using ASTM A325 or A490 Bolts." The inspection wrench shall be used on the element turned to initially tighten the bolt.
 - a. Rejected bolts shall be either replaced or retightened as required. In cases of disputed bolt installation, the bolts in question shall be checked by a calibrated wrench certified by an independent testing laboratory. The cost of certification shall be at the Contractor's expense.
4. Testing and Inspection: Material and fabrication procedures are subject to inspection and tests in the mill, shop and field by the Commissioner under the direction of the

Commissioner. Such inspection and tests shall not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

5. The Commissioner may elect to accept certificates of compliance for materials and products in lieu of specified testing procedures, except for materials and procedures for which special inspection is required.
6. Shop inspections may be made by the Commissioner at his/her discretion. Provide ample notice to the Commissioner prior to the beginning of any fabrication work so that inspection may be provided. Furnish all facilities for the inspection of materials and workmanship in the shop, and allow the inspectors free access to the necessary parts of the works.
 - a. Inspectors shall have the authority to reject any material or work that does not meet the requirements of this Section.
 - b. Inspection at the shop is intended as a means of facilitating the work and avoiding errors, but it is expressly understood that it will in no way relieve the Contractor from the responsibility for furnishing proper materials or workmanship specified herein.

G. Welding Requirements

1. All welding shall be performed by ANSI/AWS certified welders under the immediate supervision of a representative of the Commissioner. Cooperate with and assist the Commissioner in the performance of its duties.
2. All shop and field welds for structural steel will be visually inspected by an ANSI/AWS qualified welding inspector under the direction of the Commissioner. The on-site inspector will be an ANSI/AWS Certified Welding Inspector in accordance with the requirements specified in Section 6 of ANSI/AWS D1.1/D1.1M. Furnish a letter of certification for each welded connection stating that these requirements have been met.
3. At least ten (10) percent of all field welded connections will be tested by the Commissioner using an appropriate non-destructive testing method as described in ANSI/AWS D1.1/D1.1M. Acceptance criteria shall be as defined in ANSI/AWS D1.1/D1.1M.
4. Ten (10) percent of all butt and bevel welds which extend continuously for 24 inches or less will be completely tested by the Commissioner or designee in accordance with ANSI/AWS D1.1/D1.1M, Part B, Radiographic Testing of Welds, Chapter 6. All butt and bevel welds which extend continuously for more than 24 inches will be spot tested at intervals not exceeding 36 inches.
5. Correct or redo and retest welds that are required by the Commissioner or the Commissioner to be corrected as directed, at the Contractor's expense and to the satisfaction of the Commissioner.

H. Certifications: Certified mill test reports or certified tests made by the fabricator or a testing laboratory for structural steel in accordance with ASTM A6 and the governing specification shall constitute evidence of conformity with the ASTM Specification.

I. Coordination: Coordinate work of this Section with the work of other trades so that construction is not delayed.

J. Site Safety:

1. Accept total responsibility for structural steel handling and erection procedures and health and safety of the work force.
2. Comply fully with OSHA workplace safety requirements and regulations and those of other authorities having jurisdiction.
3. Provide and maintain OSHA-approved fall protection during erection of structural steel.

K. Responsibility for Errors: Accept responsibility for errors of detailing and fabrication and for the correct fit of the structural steel work.

L. Remedial Action: Promptly remove and replace materials, fabrications and workmanship found defective by the Commissioner and provide new acceptable work in accordance with Contract requirements.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to the site in an undamaged condition and at such intervals as will avoid delay in the work.

B. Exercise care to avoid bending, scraping, and overstressing the steelwork. Block with wood or otherwise protect projecting parts likely to be bent or injured.

C. Mark weight on all members. Match-mark all shop pre-fitted members.

D. Ship small parts, such as rivets, bolts, nuts, washers, pins, fillers, and small connecting plates and anchors, in boxes, crates, or barrels. Pack separately each length and diameter of bolt and each size of nut and washer. Plainly mark an itemized list and description of contents on the outside of each container.

E. Load, transport, unload, and store structural steel material in such a manner that the metal is kept clean and free from injury. Store material above ground on platforms, skids, or other supports, and cover and protect it from corrosion.

F. Identify materials by heat and lot, if applicable.

G. Replace pieces bent or damaged unless repairs are authorized by the Commissioner.

1.7 PROJECT CONDITIONS

A. General: Examine the areas and conditions under which structural steel is to be installed and notify the Commissioner promptly in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until disputed conditions, discrepancies and/or damages have been corrected, unless otherwise directed by the Commissioner.

B. Field Measurements:

1. Prior to commencement of the work, field verify existing dimensions, elevations, locations and conditions applicable to the work. Report variances and discrepancies from the Contract Drawings and potential interferences promptly to the Commissioner.
2. Take sufficient field measurements prior to preparation of Shop and Working Drawings and fabrication of construction materials, where possible, to ensure proper fitting of the

work. However, do not delay job progress. Allow for adjustments and fitting wherever the taking of field measurements before fabrication may not be possible or might delay the work.

3. Actual field-verified conditions may require modifications to the fabrication and/or erection details indicated on the Contract Drawings. Perform the work to meet actual field conditions encountered. Submit a record of variances and discrepancies on drawings to the Commissioner to document actual field-verified conditions.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL

- A. Provide structural steel in accordance with the following specifications as applicable and as indicated on the Contract Drawings.
 1. General Requirements: ASTM A6.
 2. Structural Steel Wide Flange Shapes:
 - a. Carbon Steel: ASTM A588, Grade 50.
 3. Structural Steel Channels:
 - a. Carbon Steel: ASTM A36.
 - b. Stainless Steel: ASTM A276, Type 316.
 4. Structural Steel Angles and Bars:
 - a. Carbon Steel: ASTM A588.
 - b. Stainless Steel: ASTM A276, Type 316.
 5. Structural Steel Plate:
 - a. Carbon Steel:
 - 1) General Use: ASTM A36, Galvanized unless noted otherwise.
 - 2) Plate Girders, Stiffener Plates and Welded Attachments: ASTM A588/A588M.
 - 3) Bearing Plates: ASTM A588/A588M.
 - 4) Wall Protection Plates: ASTM A588/A588M.
 - b. Stainless Steel: ASTM A167, Type 316.
 6. Rectangular or Square Tubing:
 - a. Carbon Steel: ASTM A500, Grade B, Structural Grade ($F_y = 46$ ksi).
 - b. Stainless Steel: ASTM A554, Seamless, Structural Grade.
 - c. All members shall be furnished full length without splices unless otherwise noted or accepted by the Commissioner.

7. Steel Pipe: ASTM A53, Type E or S, Grade B, Schedule 40 or 80, black finish, extra strong (XS) or double extra strong (XXS) weight as indicated on the Contract Drawings.

B. Be advised that where specified structural steel shapes conforming to ASTM A36 are not readily available, ASTM A992 or ASTM A572 Grade 50 may be substituted at no additional cost to the City of New York.

2.2 FASTENERS

A. General: Furnish bolts, nuts and washers for a given grade and diameter of bolt from a single domestic manufacturer. For each diameter, only one grade may be used. Ship bolting materials to the job site in the bolt manufacturer's unopened containers with nuts and washers assembled and lot numbers marked on the container.

B. Provide bolts and nuts that conform to applicable dimensional requirements of ANSI B18.2.1 for bolts and B18.2.2 for nuts.

C. High Strength Bolts: Provide high-strength bolts conforming to the requirements of ASTM A325, Type 1, plain, for all bolted structural joints except where standard bolts conforming to ASTM A307 are specifically permitted on the Contract Drawings. Hot-dip galvanize bolts to be connected to ASTM A588 steel framing members in accordance with ASTM A153, Class C.

D. Nuts: Nuts for ASTM A325 bolts shall conform to ASTM A563, Grade C, D, or DH or ASTM A194, Grade 2 or 2H. Hot-dip galvanize nuts to be connected to ASTM A588 steel framing members in accordance with ASTM A153, Class C.

E. Washers: Hardened washers shall conform to ASTM F436 and the requirements of the Specification for Structural Joints Using ASTM A325 or A490 Bolts. Hot-dip galvanize washers to be connected to ASTM A588 steel framing members in accordance with ASTM A153, Class C.

F. Standard Carbon Steel Bolts and Nuts: Provide carbon steel bolts, where indicated on the Contract Drawings, meeting the requirements of ASTM A307, hex, Grade A or B. Nuts for A307 bolts shall conform to ASTM A563, Grade A. Hot-dip galvanize bolts and nuts to be connected to ASTM A588 steel framing members in accordance with ASTM A153, Class C.

G. Round Washers (other than those in contact with high-strength bolt heads and nuts): Provide round washers in accordance with ANSI B18.22.1. Hot-dip galvanize washers connected to ASTM A588 steel framing members in accordance with ASTM A153, Class C.

H. Beveled Washers (other than those in contact with high-strength bolt heads and nuts): Provide square, smooth and sloped washers to make contact surface of bolt head and nut parallel.

I. Stainless Steel Bolts and Nuts: Provide stainless steel bolts conforming to ASTM F593 with nuts conforming to ASTM F594.

J. Anchor Bolts: Provide non-headed anchor bolts meeting the requirements of ASTM F1554, Grade 55, hot-dip galvanized, either bent or straight and of the diameter and length as indicated on the Contract Drawings. Galvanize anchor bolts, rods, nuts and washers under the supervision of the bolt manufacturer in accordance with ASTM A153, Class C.

- K. Headed Anchors (Welded Shear Studs): Provide weldable, uncoated headed anchors meeting the requirements of ASTM A108 in accordance with ANSI/AWS D1.1, of the diameter and length shown on the Contract Drawings.
- L. Lubricant for Bolts: Provide molybdenum disulfide base lubricant for bolts.
- M. Steel Plate Washers: Fabricate from ASTM A36 or ASTM A572 Grade 50 structural grade plate or bar for use in oversized, short-slotted and long-slotted holes. Conform to ASTM standards and the requirements of the Specification for Structural Joints Using ASTM A325 or A490 Bolts. Plate washers need not be fabricated from hardened steel.
- N. Powder-Actuated Fasteners: Provide powder-actuated headed steel anchors designed for heavy duty applications into a structural steel substrate. Provide the head diameter, length and spacing required for the intended application and as shown on the Contract Drawings.
 - 1. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. PowerPoint Drive Pin, ITW/Ramset/Redhead, Wood Dale, IL.
 - b. Drive Pin Fastener, Powers Fasteners, New Rochelle, NY.
 - c. Or approved equal.

2.3 WELDING ELECTRODES

- A. Use E70XX electrodes in conformance with ANSI/AWS Code (ANSI/AWS A5.1 or A5.5).
- B. For shop and field welding, use low hydrogen E70XX electrodes.
- C. For shop and field welding of weathering steel (ASTM A588 Grade 50), use low hydrogen E70XX electrodes.
- D. Use E316 electrodes for welding Type 316 stainless steel base metal.
- E. Use E318 electrodes for welding Type 304 stainless steel base metal.
- F. No field welding will be permitted except where indicated on approved Shop Drawings and approved by the Commissioner.

2.4 NON-SHRINK GROUT

- A. Provide non-shrink grout in accordance with the provisions of Section 03300.

2.5 GALVANIZING REPAIR PAINT

- A. Provide high zinc-dust/zinc oxide content paint for repair of damaged galvanized surfaces and field touch-up of welds that meets the following requirements:
 - 1. One application shall provide a minimum dry coating thickness of 2.0 mils.
 - 2. Dried film shall have a minimum zinc dust content equal to 94% by weight.
 - 3. The applied coating shall provide barrier protection and be anodic to steel.

4. The coating may be applied under both shop and field conditions.
 5. The product used shall be approved by the galvanizer and shall be compatible with the galvanized surfaces and inert in concrete.
- B. VOC Limit: Provide galvanizing repair paint with maximum VOC content of 250 grams per liter.
- C. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
1. ZRC, Z.R.C. Worldwide, Quincy, MA.
 2. Zinc Clad; Sherwin Williams, Cleveland, OH.
 3. Or approved equal.

PART 3 - EXECUTION

3.1 FABRICATION

A. General

1. The fabricator shall provide an affidavit stating that the structural steel furnished meets the requirements of the grade specified. All unidentified steel will be rejected and shall be removed from the site and replaced by the Contractor, at no additional cost to the City of New York.
2. Fabricate and shop-assemble work in accordance with AISC Specification for Structural Steel Buildings; Code of Standard Practice for Steel Buildings and Bridges; and Specification for Structural Joints Using ASTM A325 or A490 Bolts.
3. Members shall be straight and shall fit closely together. The finished work shall be free from burrs, twists, bends, open joints and other imperfections.

B. Connections

1. Unless noted otherwise herein or on the Contract Drawings, all beam connections shall be designed for reaction values indicated on the Contract Drawings.
2. Wherever beam reaction values or connection details are not shown, design the minimum connection to support one-half (50%) of the total uniform load capacity tabulated in the AISC tables for allowable loads for laterally supported beams for the given shape, span, and steel specified for the beam in question. Where the number of bolts is not indicated, connections shall be full depth. Design of structural steel connections for which connection details or beam reaction values are not shown on the Contract Drawings shall be prepared under the supervision of a licensed Professional Engineer registered in the State of New York.
3. Use high-strength bolted connections of the size and type indicated on the Contract Drawings. Unless otherwise shown on the Contract Drawings or specified herein, bolted connections for primary steel members shall be made with 3/4-inch diameter ASTM A325 high strength bolts in bearing-type connections with fully pretensioned bolts. Use beveled washers against sloping flanges. Contact joint surfaces of friction-type bolted connections shall be free of oil, lacquer or other contaminants.
4. Bolted connections for secondary members (such as girts and stair framing) may be made with 3/4-inch diameter machine bolts conforming to ASTM A307.

5. Gusset plates and connection angles shall be 3/8 inch minimum in thickness.
 6. Beam-splice connections are not permitted unless shown on the Contract Drawings.
 7. Where a beam connection is required to carry moment, design the connection for the allowable moment capacity of the smallest connected member.
 8. Use steel plate washers for oversized, short-slotted and long-slotted holes in accordance with the requirements of the Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- C. Each bracing connection shall have a minimum of two ASTM A325 high-strength bolts in a slip-critical Class A connection or the equivalent in weld strength unless otherwise shown on the Contract Drawings or approved Shop Drawings.
- D. Bearing stiffeners and stiffeners intended to support concentrated loads shall have full bearing on flanges to which they transmit load and on those from which they receive load. Mill or grind stiffener bearing surfaces. On weldable steel in compression areas of flanges, stiffeners may be welded as indicated. Stiffeners not located at points of concentrated loads shall be tight to that degree which will exclude water after being painted, unless otherwise indicated.
- E. Indicated steel dimensions are those which shall exist when ambient worksite temperature is 60°F. Dimensions at fabrication time shall be based on the formula:
- $$L = D[1+ET]$$
- where L = Dimension at fabrication time, in inches.
 D = Indicated steel dimensions, in inches.
 E = 0.0000065
 T = T(fab) - 60
 T(fab) = Temperature at fabrication time in degrees F
- F. Plane sheared edges of plates thicker than 5/8 inches and carrying calculated stress to a depth of 1/4 inches. If so indicated, face abutting joints and bring those joints to an even bearing. Build floor beams, stringers, and girders having end connection angles to exact length, back-to-back, of connection angles. If end connections are faced, finished thickness of angle shall be not thinner than that indicated. Machine-flatten metal bearing surfaces which will contact cement mortar grout to within 1/8-inch tolerance in 1 inches and to within 3/16 inch overall.
- G. Welding: Perform welding in accordance with ANSI/AWS D1.1/D1.1M except as modified herein.
1. Perform procedure and sequence of welding so as to avoid unnecessary distortion and minimize stresses.
 2. Make allowance in shop for expected weld shrinkage in laying out and assembling members. Trim members to size only when most or all of welding has been completed.
 3. Repair defective welds by chipping or melting out such defects from one or more sides of joint as required removing only weld metal necessary to correct defect. Reweld and have weld tested, as directed by the Commissioner and at no additional cost to the City of New York.
- H. Provide holes in structural steel members required for anchors, anchor bolts, bolt holes, connection angles, supports and braces for stair stringers, equipment apparatus, sag rods, or other

members noted on the Contract Drawings shall be provided by the fabricator and detailed on the Shop Drawings.

- I. Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, where indicated on the Contract Drawings. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
- J. Provide slotted or oversized holes in framing members where indicated on the Contract Drawings or where necessary to facilitate steel erection. Hole sizes and slot lengths shall conform to AISC standards.
- K. Where shop assembly of field connections is shown, specified or required, the unmatched holes shall be reamed and the pieces match-marked before disassembly. The interchange of matching parts will not be permitted.

3.2 PROTECTIVE COATINGS

- A. Examination: At the request of the Commissioner, provide access for the Commissioner to visit the fabricator's facility to inspect structural steel immediately prior to initial shop painting operations.
- B. Surface Preparation: After fabrication and before painting or galvanizing, clean new steelwork to be painted or galvanized by removing loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel to be painted in accordance with SSPC-SP 6.
- C. Galvanizing: Hot-dip galvanized structural steel products and appurtenances indicated on the Contract Drawings to be galvanized after fabrication in accordance with ASTM A123 and A153, as applicable. Fabricate products either complete or in largest practical sections before galvanizing. Weight of zinc coating shall be Coating Grade 85 (2.0 ounces per square foot) as specified in ASTM A123, Section 6.
- D. Shop Painting:
 - 1. Perform shop painting in accordance with the requirements of Section 09960 as applicable.
 - 2. Shop paint new structural and miscellaneous steel not otherwise galvanized or coated as specified herein, except as given below.
 - a. Apply structural steel primer paint in the shop to all new steel surfaces including those to be encased in concrete except ASTM A588 weathering steel and those to be machined or welded.
 - b. Primer paint may be applied to uncoated faying surfaces (i.e. contact surfaces) at high-strength bolted with slip-critical (friction-type) connections provided that the coating is certified to provide a Class A or Class B faying surface in accordance with the test method adopted by the Research Council on Structural Connections (RCSC) as presented in the "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

- 1) Section 5.4 of the RCSC specification defines a Class A faying surface as an uncoated clean mill steel surface or blast-cleaned steel surface protected by a Class A coating with a coefficient of friction not less than 0.33.
 - 2) A Class B faying surface is similarly defined as an uncoated blast-cleaned steel surface or a surface protected by a Class B coating on blast-cleaned steel with a coefficient of friction not less than 0.50.
- c. If coating requirements of sub-paragraph 3.2.D.2.c above cannot be met, faying surfaces at slip-critical connections shall be masked off to exclude paint including inadvertent overspray. Uncoated faying surfaces shall be free of scale, except tight mill scale, and free of coatings in areas closer than one bolt diameter but not less than one inch from the edge of any hole and in all areas within the bolt pattern.
- d. Stainless steel shall not be primed or painted.

3. Shop Coat:

- a. Prime Coat: Immediately after surface preparation, apply shop prime paint as specified in Section 09960, as applicable, and in accordance with coating manufacturer's instructions. Use painting methods that result in full coverage of joints, corners, edges and exposed surfaces.
- b. Finish painting of structural steel shall be performed in the field as specified in Section 09960, as applicable.

E. Field Painting:

1. Plies of slip-critical joints with coated faying surfaces shall not be assembled before the coating has cured for the minimum time that was used in the coating qualifying tests.
2. Field painting shall not proceed until all erection is complete including field bolting and field welding unless otherwise permitted by the City of New York.
3. Touch-up paint shop coated surfaces damaged during erection, exposed surfaces of fasteners and field welds with prime coat paint applied for the shop.
4. Apply intermediate and final coats in the field in accordance with Section 09960 as applicable.

3.3 ERECTION

- A. Erection shall be in accordance with the Contract Documents, AISC Manual of Steel Construction, AISC Code of Standard Practice for Steel Buildings and Bridges, OSHA 29 CFR Part 1910 and Part 1926, and any other applicable state, municipal, or local regulations or codes.
- B. Report any damage caused during erection to the Commissioner. Complete corrective measures as directed by the Commissioner at no cost to the City of New York.
- C. Do not place temporary erection loads or permanent loads on any incomplete portions of the structure being erected unless it can be demonstrated by analysis in writing that the contemplated action is safe.
- D. Keep loose timbers, metal sheeting, bolt buckles, tools, debris, and temporary scaffolding restrained or removed from work areas. Assume responsibility for securing all equipment and materials within the steel erector's care, custody, and control during the erection operation.

- E. Maintain the job site in clean and safe condition at all times and properly dispose of, off premises, all crating, waste materials, and other refuse which has accumulated as a result of erection activities.
- F. Perform lifting of painted structural members with a non-abrasive choker.
- G. Keep a daily record, by piece number, of all material erected.
- H. Before commencing work, check foundations and other connection points to confirm their location, orientation, elevation, and condition.
- I. Anchor Bolts:
 - 1. All anchor bolts for structural steel erection and other incidental items of the structural steel required to be built into concrete shall be properly set and securely held in position in the forms before the concrete is placed.
 - 2. Install anchor bolts accurately in position shown on the approved erection drawings within the permissible dimensional variations given in the AISC Code of Standard Practice.
 - 3. If anchor bolts are cast in substructure when it is being constructed, ensure that they are firmly held in their correct position and elevation by suitable templates. Set anchor bolts accurately to the template to provide suitable projection above concrete and/or grout as specified in AISC Code of Standard Practice. Set anchor bolts perpendicular to the theoretical bearing surface.
 - 4. If approval is given for installing anchor bolts in preformed holes or in drilled holes in concrete or masonry, use approved epoxy resin product as specified in Section 03300 - Cast-in-Place Structural Concrete, for securing them in place.
 - 5. Where misalignment between anchor bolts and bolt holes in steel members is encountered, notify the Commissioner immediately. Submit a method to remedy the misalignment for review and approval by the Commissioner.
- J. Misfits at Bolted Connections:
 - 1. Where misfits in erection bolting are encountered, immediately notify the Commissioner. Submit a method to remedy the misfit for review by the Commissioner. The Commissioner will determine whether the remedy is acceptable or if the member is required to be refabricated.
 - 2. Incorrectly sized or misaligned holes in members shall not be enlarged by burning or by the use of drift pins. Notify the Commissioner immediately and submit a proposed method of remedy for review by the Commissioner.
- K. Field Assembly:
 - 1. All materials shall be properly worked and match-marked for field assembly. Where finishing is required, complete assembly including bolting and welding of units before start of finishing operations.
 - 2. Splice only where indicated on the approved Shop Drawings.
 - 3. Align and adjust members forming parts of a complete assembly after assembly and before fastening.
 - 4. Thoroughly clean surfaces to be joined together.

5. Fasten splices of compression members after the abutting surfaces have been brought completely into contact.
 6. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 7. All field connections shall be accurately fitted up before being bolted. Limit drifting only to the extent that will bring the parts into position and not cause enlargement of the holes or distortion of the metal. Drill or ream all unfair holes.
- L. Report immediately to the Commissioner errors in shop fabrication or deformation resulting from handling or transportation which prevents the proper erection and fitting of parts.
- M. Grouting of Bearing Plates: All loose bearing plates and billets shall be accurately set to the designated levels on steel wedges, leveling bolts or angle screeds in preparation for grouting.
1. Prior to the placement of non-shrink grout beneath bearing plates, clean the bottom surface of the plates of all foreign materials, and clean concrete bearing surfaces of all foreign materials and roughen surface to improve bonding.
 2. Tighten anchor bolts after the supported members have been positioned and plumbed and the non-shrink grout has attained its specified strength.
 3. Grout base plates with non-shrink grout to assure full uniform bearing. Perform grouting prior to placing loads on the structure.
- N. As erection progresses, perform sufficient bolting of the work to support dead load, wind load and erection loads. Perform permanent bolting when final alignment is completed.
- O. Ensure that holes are not enlarged and that the drifting done during assembly does not disturb or damage the metal in the vicinity of the holes.
- P. Enlarge holes to admit bolts for connections only if approved by the Commissioner. Make enlargements by reaming or drilling and not by burning. Avoid hand reaming. Do not burn holes through in the field to accommodate bolts.
- Q. Do not weld main stress members in the field unless otherwise indicated on the Contract Drawings or on reviewed Shop Drawings.
- R. Bolted Connections:
1. Install high-strength bolts in accordance with the "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
 2. Furnish and install high-strength bolts, washers and nuts in conformity with all resolutions of the Board of Standards and Appeals, relevant sections of the City of New York Building Code, and the latest rules relating to high-strength bolts by the City of New York Building Services Department.
 3. Do not inter-mix mechanically galvanized bolts and nuts with hot-dip galvanized nuts and bolts.
 4. Color code, die punch, or otherwise mark the ends of torqued bolts indicating that the bolts have been properly tensioned and are ready for inspection.
- S. Welded Connections:

1. Weld in accordance with ANSI/AWS D1.1/D1.1M, except as modified herein. Bolts for temporarily fastening welded splices and welded connections shall be either tightened securely and left in place or removed and the holes filled with high strength bolts and fully torqued. If left in place, burn off portion of bolt which projects beyond nut. If bolt does not project beyond nut, tack weld end of bolt to nut. Burn off and tack weld before painting. Location and number of welded splices shall be as indicated on the Contract Drawings or on approved Shop Drawings.
2. Make all welds continuous unless alternate welding procedures are shown on the approved Shop Drawings or approved in writing by the Commissioner.
3. Field Welds: Surfaces within 2 inches of any field weld location shall be free of materials that would prevent proper welding or produce objectionable fumes while welding is being done.

T. **Headed Anchors (Welded Shear Studs):** Prior to welding headed anchors, prepare steel surfaces as recommended by the manufacturer of the connectors. As a minimum, remove any paint, oil, grease, loose mill scale and any other substance that may impair the proper welding of the stud. Weld only on dry surfaces. Weld headed anchors at the spacing shown on the Contract Drawings. Use automatic end welding of headed anchors in accordance with the manufacturer's printed instructions.

U. **Powder-Actuated Fasteners:** Install powder-actuated fasteners to connect steel component to structural steel surface for the locations, fastener size and spacing indicated on the Contract Drawings and in accordance with the manufacturer's instructions. Maintain minimum edge distance to centerline of fastener as recommended by the fastener manufacturer.

V. **Cutting and Burning:** The use of a gas cutting torch in the field for correcting fabrication errors will not be permitted on a stress-carrying structural steel member. Its use may be permitted on other members if the member is not under stress, and only after the written approval of the Commissioner has been obtained.

1. No cutting of structural steel members in the field will be allowed except by written approval of the Commissioner.
2. All cutting shall be done with an oxyacetylene torch in conformity with the City of New York Building Code and the latest rules of the Board of Standards and Appeals.

W. **Post-installed Anchor Installation:** Install chemical adhesive anchors in accordance with the manufacturer's written instructions for all hole orientations except overhead installations. Install mechanical expansion anchors for overhead installations in accordance with the manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. **Correction of Defects:**

1. No packing, shimming, filling, or wedging will be permitted to correct defects unless approved by the Commissioner.
2. Provide a sufficient quantity of shim plates to fill the spaces at field bolted connections. Maximum total thickness shall not exceed tolerances permitted by the AISC Code of Standard Practice.

3. Repair damaged areas of hot-dip galvanized surfaces with approved zinc cold galvanizing compound.
 4. Surface Preparation: Remove foreign matter from damaged area and from adjacent undamaged area. Solvent clean per SSPC-SP1 followed by power tool cleaning per SSPC-SP3.
 5. Immediately thereafter, apply cold galvanizing compound to the prepared area at the rate of 2.0 mils dry film thickness (400 square feet/gallon).
- B. Repair all field storage, handling and erection damage to shop-applied paint coatings in accordance with the appropriate painting specification Section 09960. Paint all galvanized bolt assemblies tightened against shop-applied paint.
- C. Non-conforming Work:
1. Repair or replace non-conforming structural steel work as directed by the Commissioner and at no additional cost to the City of New York.
 2. Promptly remove and replace materials, fabrications and workmanship found defective and provide new acceptable work in accordance with applicable Contract requirements.

END OF SECTION 05120

SECTION 05500 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. **Work Included:** Provide metal fabrications in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:
1. Steel framing and supports for overhead coiling doors.
 2. Steel framing and supports for mechanical and electrical equipment.
 3. Metal plates and supports.
 4. Pipe bollards.
 5. Downspout guards.
 6. Stainless steel protection plates.
 7. Miscellaneous steel trim.
 8. Miscellaneous framing and supports.
 9. Rough hardware.
 10. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- B. **Related Sections:**
1. Division 3, Section "Cast-In-Place Structural Concrete."
 2. Division 5 - Metals.
 3. Division 8, Section "Overhead Coiling Doors."
 4. Division 9, Section "High Performance Coating."

1.2 SUBMITTALS

- A. **Product Data:** Submit manufacturer's product data for products used in miscellaneous metal fabrications, including paint products and grout.
- B. **Shop Drawings:** Submit shop drawings for fabrication and erection of metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchors and bolts installed by others.
1. Where fabrications are indicated to comply with design loadings, include structural computations, material properties, and other information needed for structural analysis.
 2. Structural data shall be signed and sealed by the qualified professional engineer who was responsible for their preparation.
- C. **Samples:** Submit samples representative of materials and finished products as may be requested by Commissioner.
- D. **Certifications:** Submit welding certificates certifying that welders comply with requirements of "Quality Assurance" article.

1.3 QUALITY ASSURANCE

- A. Fabricator: Firm experienced in successfully producing metal fabrications similar to those required for this Project.
- B. Installer: Arrange for installation of metal fabrications by same firm that fabricated them.
- C. Welding: Qualify welding processes and operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel," and D1.6 "Stainless Steel Welding Code".
- D. 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 sightlines, 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, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Commissioner, except with Commissioner's approval. If modifications are proposed, submit comprehensive explanatory data to Commissioner for review.
- E. Engineer Qualifications: Professional engineer licensed to practice in the State of New York and experienced in structural engineering of metal fabrications similar to those indicated for this Project.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings.

1.5 COORDINATION

- A. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. 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. Deliver such items to Project site in time for installation.
- B. Coordinate installation of formed metal copings with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design overhead coiling door framing, including comprehensive engineering analysis by a licensed professional engineer, using performance requirements and design criteria indicated.

- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

- A. Metal Surfaces, General: For exposed metal fabrications, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Bent Steel Plates (Cold Formed): ASTM A 283, Grade C.
- D. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 316L.
- E. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.
- F. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- G. Rolled-Stainless-Steel Plate: ASTM A 793.
- H. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- I. Steel Pipe: ASTM A 53, Grade B, or ASTM A 120; of type and grade as required for design loading, black finish, unless indicated to be galvanized.
- J. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- K. Gray Iron Castings: ASTM A 48, Class 30.
- L. Galvanized Steel Sheet: ASTM A 446; Grade A, and G90 coating designation, unless otherwise indicated.
- M. Cast Steel: ASTM A 27.
- N. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- O. Concrete Inserts: Threaded or wedge type; galvanized malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per A.

- P. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

2.4 GROUT AND ANCHORING CEMENT

- A. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621, and recommended by manufacturer for interior and exterior use.
 - 1. Provide "Euco N-S Grout" as manufactured by Euclid Chemical Co., or approved equal.
- B. Hydraulic Anchoring Cement: Factory-prepackaged, non-shrink, non-staining hydraulic controlled expansion cement formulation for mixing with water at Project site to create a pourable anchoring - patching - grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for applications indicated.
 - 1. Provide "Por-rok" hydraulic cement as manufactured by Hallemite Manufacturing Co.; "Quik-rok" as manufactured by Preco Chemical Co.; "Vitrobond" as manufactured by Atlas Minerals and Chemical Corp., or approved equal.

2.5 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners. Select fasteners for type, grade, and class required.
 - 1. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 2 (A4).

2.6 PAINT AND HIGH PERFORMANCE COATINGS

- A. Epoxy Zinc Shop Primer for Ferrous Metal: Refer to Division 9, Section "High Performance Coating" for requirements.
- B. Galvanizing Repair Paint: Paint with dry film containing not less than 94 percent zinc dust by weight, and complying with SSPC-Paint-20.
- C. Intermediate Epoxy Coating for Ferrous Metal: Refer to Division 9, Section "High Performance Coating" for requirements.
- D. Polyfunctional Hybrid Urethane for Ferrous Metal: Refer to Division 9, Section "High Performance Coating" for requirements.
- E. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers. Comply with ASTM D 1187, Type II.

2.7 FABRICATION, GENERAL

- A. Form metal fabrications of size, thickness, and shapes indicated but not less than needed to comply with performance requirements. Work to dimensions on shop drawings, using proven details of fabrication and support. Use type of materials indicated.

- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges slightly.
- C. Allow for thermal movement resulting from 100 deg. F change (range) in air temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners.
- D. Shear and punch metals cleanly and accurately. Remove burrs. Remove sharp or rough areas on exposed traffic surfaces.
- E. Ease exposed edges to a radius of approximately 1/16 inch. Form bent-metal corners to smallest radius possible without impairing work.
- F. Weld corners and seams continuously to comply with AWS recommendations and the following:
 - 1. Minimize distortion and develop strength of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish exposed welds smooth and flush with adjacent surfaces.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use Phillips flat-head fasteners where exposed. Locate joints where least conspicuous.
- H. Provide for anchorage of type indicated. Fabricate and space anchoring devices to provide adequate support for intended use.
- I. Preassemble items in shop where possible. Disassemble units only as necessary for shipping and handling. Use connections that maintain structural value of joined pieces.
- J. Cut, reinforce, drill and tap miscellaneous metal work as required to receive finish hardware, screws, and similar items.
- K. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.8 STEEL FRAMING FOR OVERHEAD COILING DOORS

- A. Fabricate structural-steel door frames from steel shapes, plates, and bars of size and to dimensions indicated, fully welded together, with 5/8-by-1-1/2-inch steel channel stops, unless otherwise indicated. Plug-weld built-up members and continuously weld exposed joints. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than 10 inches o.c. Reinforce frames and drill and tap as necessary to accept finish hardware.
 - 1. Provide with integrally welded steel strap anchors for securing door frames into adjoining concrete.
 - 2. Refer to the Structural Drawings for steel types.
- B. Extend bottom of frames to floor elevation indicated with steel angle clips welded to frames for anchoring frame to floor with expansion shields and bolts.

- C. Galvanize steel frames.
 - D. Prime steel frames with primer specified in Division 9, Section "High-Performance Coatings."
- 2.9 METAL PLATES AND SUPPORTS
- A. Fabricate from rolled-stainless-steel plate of thickness indicated below:
 - 1. Thickness: As indicated.
 - 2. Type: 316 L.
 - B. Provide stainless-steel angle supports as indicated.
 - C. Include stainless-steel angle stiffeners, and fixed and removable sections as indicated.
- 2.10 PIPE BOLLARDS
- A. Fabricate concrete filled pipe bollards from circular, 3/8 inch circular steel pipe in diameter indicated on the Drawings. Fill bollards with concrete as specified in Division 3, Section "Cast-In-Place Structural Concrete." Provide steel cap of same metal type for bollards.
 - B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4 inch thick steel plate welded to bottom of sleeve, unless otherwise indicated.
 - C. Shop Applied Powder-Coat Finish: Shop applied thermoset acrylic powder-coat finish, AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Color and Gloss: OSHA yellow.
- 2.11 MISCELLANEOUS STEEL TRIM
- A. Unless otherwise indicated, fabricate units from Type 316 L stainless steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
 - B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- 2.12 MISCELLANEOUS FRAMING AND SUPPORTS
- A. General: Provide steel framing and supports as required to complete work.
 - B. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items. Include the following items:

1. Equip units with integrally welded anchors for casting into concrete. Furnish inserts if units must be installed after concrete is placed.
2. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide x 1/4 inch x 8 inches long.

C. Galvanize all steel miscellaneous framing and supports.

2.13 ROUGH HARDWARE

- A. 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 Division 6, Section "Rough Carpentry."
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.14 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
- B. Finish metal fabrications after assembly.

2.15 STEEL AND IRON FINISHES

- A. Galvanizing: Unless otherwise indicated all exterior steel items shall be hot-dip galvanized. Apply zinc-coating by the hot-dip process in compliance with the following requirements:
 1. ASTM A 153 for galvanizing iron and steel hardware.
 2. ASTM A 123 for galvanizing iron and steel shapes, plates, bars, and strip 0.0299 inch thick and heavier.
- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below:
 1. Items Indicated to Receive Primers Specified in Division 9, Section "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Apply shop primer to uncoated metal, except surfaces with galvanized finish or to be embedded in concrete. Comply with SSPC-PA1 "Paint Application Specification No. 1" for shop painting.
 1. Refer to Division 9, Section "High Performance Coating" for primer and requirements.
- D. Intermediate and Finish Coats: Refer to Division 9, Section "High Performance Coating" for intermediate and finish coats and requirements.

2.16 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend 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. Directional Polish: No. 4 satin finish.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams and directions for installation of anchorages that are to be embedded in concrete or masonry. Coordinate delivery of such items.
- B. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

- A. Anchors: Provide anchors and fasteners where necessary for securing metal fabrications to in-place construction.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete construction.
- E. Fit exposed connections accurately to form hairline joints. Weld connections that cannot be shop welded. Do not weld, cut, or abrade units which have been hot-dip galvanized after fabrication.
- F. Field Welding: Comply with AWS Code for welding, appearance and quality of welds made, methods used in correcting welding work, and as required for shop welding.
- G. Corrosion Protection: Coat concealed surfaces of metal that will come into contact with dissimilar materials with a heavy coat of bituminous paint or zinc chromate primer.
- H. Manufactured Items: Install manufactured products to comply with manufacturer's instructions unless otherwise shown.

3.3 INSTALLING METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
 - 1. Do not fill removable bollards with concrete.
- B. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete. Fill annular space around bollard solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

3.5 ADJUSTING AND CLEANING

- A. 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. Comply with SSPC-PA 1 to provide a minimum dry film thickness of 2.0 mils.
- B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 05500

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SECTION 05510 - EXTERIOR METAL STAIRS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide metal fabrications in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Industrial-type stairs with steel grating treads.
2. Steel tube railings attached to metal stairs.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal stairs, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Uniform Load: 100 lbf/sq. ft.
 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
 3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 5. Limit deflection of treads, platforms, and framing members to L/240 or 1/4 inch, whichever is less.
- C. Structural Performance of Railings: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.

1.3 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- B. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Qualification Data: For qualified professional engineer.

- D. Welding certificates.
- E. Product Test Reports: If required by local authorities having jurisdiction, provide test reports based on evaluation of comprehensive tests performed by a qualified testing agency, for stairs and railings.
 - 1. Test railings according ASTM E 894 and ASTM E 935.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Industrial-Type Stairs: Industrial class.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.5 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for metal stairs. 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.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

- D. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.
- E. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, either commercial steel, Type B, or structural steel, Grade 30, unless another grade is required by design loads.
- F. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 coating, either commercial steel, Type B, or structural steel, Grade 33, unless another grade is required by design loads.

2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts for stairs indicated to be galvanized and stairs indicated to be shop primed with zinc-rich primer.
- D. Machine Screws: ASME B18.6.3.
- E. Lag Screws: ASME B18.2.1.
- F. Plain Washers: Round, ASME B18.22.1.
- G. Lock Washers: Helical, spring type, ASME B18.21.1.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
 - 3. Fabricate treads and platforms of exterior stairs so finished walking surfaces slope to drain.
- B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections 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. Weld exposed corners and seams continuously unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 3 welds: partially dressed weld with spatter removed.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.
- H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.6 STEEL-FRAMED STAIRS

- A. Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."
 - 1. Fabricate treads and platforms from welded or pressure-locked steel grating with openings in gratings no more than 1/2 inch in least dimension.
 - 2. Surface: Plain.
 - 3. Finish: Galvanized.
 - 4. Fabricate grating treads with rolled-steel floor plate nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.

5. Fabricate grating platforms with nosing matching that on grating treads. Provide toeplates at open-sided edges of grating platforms. Weld grating to platform framing.

2.7 STAIR RAILINGS

- A. Assemble railings in the 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 reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- B. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.8 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Galvanizing: Hot-dip galvanize all stair and railing components to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
 2. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.

3.2 INSTALLING METAL STAIRS

- A. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonmetallic, nonshrink grout unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING RAILINGS

- A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
 - 1. Anchor posts to steel by welding directly to steel supporting members.
 - 2. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with postinstalled anchors and bolts.
- B. Attach handrails to stairs with wall brackets. Use type of bracket with predrilled hole for exposed bolt anchorage. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure brackets to stair construction as required to comply with performance requirements.

3.4 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05510

SECTION 05532 – STAINLESS STEEL FLOOR GRATING AND PLATE

PART 1 - GENERAL

1.1 SUMMARY

- A. The work specified in this Section consists of all labor, materials, equipment and services necessary to furnish, fabricate and install stainless steel floor grating and floor plate and accessories of consistent type and size, complete in place as shown on the Contract Drawings, as specified herein and as required for a complete installation in accordance with Contract requirements.
- B. Stainless steel floor grating and floor plate shall be furnished complete with stainless steel frames, anchors, fastening devices, and miscellaneous appurtenances. Floor plate at watertight or gas-tight applications shall be furnished with neoprene gaskets where shown or specified.
- C. The work includes all incidental and miscellaneous items not specified under another Section but required for the work of this Section, whether or not specifically referred to herein.
- D. This Section includes, but is not limited to, the following items:
 - 1. Stainless Steel Floor Grating.
 - 2. Stainless Steel Floor Plate.
 - 3. Fastening Devices.

1.2 RELATED SPECIFICATIONS

- A. Section 03300 – Cast-in-Place Structural Concrete.
- B. Section 05120 – Structural Steel.

1.3 REFERENCES

- A. The work covered in this Section shall conform to the latest edition and latest addenda thereto of the following publications to the extent referenced. The publications are referred to in the text by the basic designation only.
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM A167, Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - b. ASTM A276, Stainless and Heat-Resisting Steel Bars and Shapes.
 - c. ASTM A480, General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plates, Sheet and Strips.
 - d. ASTM A666, Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar.
 - e. ASTM A793, Rolled Floor Plate, Stainless Steel.
 - f. ASTM F593, Stainless Steel Bolts, Hex Cap Screws and Studs.
 - g. ASTM F594, Stainless Steel Nuts.

2. National Association of Architectural Metal Manufacturers (NAAMM):
 - a. ANSI/NAAMM MBG 531, Metal Bar Grating Manual.
 - b. ANSI/NAAMM MBG 532, Heavy Duty Metal Bar Grating Manual.
 - c. NAAMM MBG 533, Welding Specifications for Fabrication of Steel, Aluminum and Stainless Steel Bar Grating.
3. City of New York
 - a. New York City Building Code, Local Law 76/2008, latest edition and amendments or supplements thereto.
 - b. New York City Board of Standards and Appeals (BS&A), latest edition and amendments or supplements thereto.

1.4 DESIGN AND PERFORMANCE REQUIREMENTS

- A. The minimum design live load for stainless steel floor grating or floor plate covering floor openings shall be that designated for the adjacent floor area but not less than a uniform load of 150 pounds per square foot or a concentrated load of 300 pounds distributed over a 12-inch square area at the center of span, whichever produces the greater stress.
- B. Floor grating or floor plate in areas subject to vehicular traffic shall be designed for the maximum weight vehicle that can access the area. The maximum design wheel loads for wheeled vehicles shall be as indicated on the Contract Drawings or as defined by the approved manufacturer. When design wheel loads are not indicated on the Contract Drawings for a certain area or defined by the manufacturer, the design wheel loads shall be defined as 40 percent of the gross loaded weight of the maximum size vehicle to be accommodated.
- C. The maximum allowable deflection due to dead load plus live load shall not exceed the span divided by 240, but not more than 1/4 inch.
- D. Design stainless steel floor grating and floor plate in accordance with the design criteria specified herein, and the NAAMM specifications, unless otherwise noted on the Contract Drawings or as required by the New York City Building Code, Local Law 76/2008.
- E. Stainless steel plate thickness shall be 1/4 inch minimum. In the event the 1/4-inch plate does not meet the specified deflection or allowable stress criteria, the plate shall be thickened or stiffened with stainless steel angles or bars welded to the bottom of the plate as needed to meet the specified deflection criteria. Stiffeners shall extend to within 2 inches of supports as a minimum. The ends of all stiffeners shall be welded to a continuous stiffener extending the length of the plate.

1.5 SUBMITTALS

- A. Submit the following in accordance with applicable Contract requirements:
 1. Shop Drawings and Working Drawings, including shop fabrication drawings, and material specifications of all stainless steel floor grating and floor plate.
 2. Manufacturer's specifications and installation instructions for all proprietary materials and accessories.

3. Design Calculations: Provide manufacturer-certified structural calculations for review and approval to verify that proposed stainless steel floor grating and floor plate meet minimum wheel load design requirements.
 4. Description of proposed supports for each type and location of floor grating and floor plate.
 5. Submit samples of floor grating, floor plate and fastening devices for review and approval by the Commissioner.
- B. Base Shop Drawings upon field-verified dimensions and elevations of existing or partially constructed supporting structure, where applicable, to allow proper review of Shop Drawings.
- C. Check Shop Drawings for completeness and accuracy and make necessary corrections prior to submittal for review and approval. Obtain Commissioner's approval prior to fabrication.
- D. Product Data: Manufacturer's specifications and installation instructions for all proprietary materials and reinforcement accessories, including:
1. Gratings and floor plates.
 2. Clips and anchorage devices for gratings and floor plates.
 3. Any other proprietary materials for reinforcement or attachment accessories.
- E. Do not manufacture or fabricate floor grating and floor plate until the Contractor's Shop Drawings and Working Drawings have been approved by the Commissioner.
- F. Qualifications Compliance: Submit references and project information to demonstrate the proposed floor grating and floor plate manufacturer's specialized experience on similar projects of comparable scope and complexity.
- G. Design Calculations: Provide structural calculations for review and approval to verify that proposed grating and checkered plate comply with design loads, including meeting minimum wheel load design requirements. Calculations shall be data signed and sealed by the qualified Professional Engineer licensed in the State of New York who is responsible for their preparation.
- H. Mill Certificates: Signed by manufacturers of steel sheet certifying that products furnished comply with requirements.

1.6 QUALITY ASSURANCE

- A. All work shall comply with the provisions of the New York City Building Code, Local Law 76/2008, and the rules of the Board of Standards and Appeals, latest edition of each and amendments or supplements thereto.
- B. Qualification of Manufacturer: Stainless steel floor grating and floor plate and accessories shall be provided where indicated on the Contract Drawings and shall be the products of a reputable manufacturer or manufacturers specialized in such work who is regularly engaged in the manufacture of steel floor grating and checkered plates with a minimum of three (3) years of documented experience.
- C. Testing and Inspection: Material and fabrication procedures are subject to inspection and tests in the mill, shop and field by the Commissioner. Such inspection and tests shall not relieve the

Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

- D. **Factory Inspection:** Except as specified otherwise in this paragraph, factory tests and inspections of materials for which inspections and tests are specified herein or in referenced documents, will not be required provided that certified copies of factory test reports, which shall include manufacturer's certificates of compliance with all requirements of these specifications, are submitted to and approved by the Commissioner. When the test reports are on materials previously manufactured, test reports shall be accompanied by notarized statements from the manufacturer certifying that the materials being furnished are identical with previously manufactured materials on which the factory test reports are based.
- E. **Shop and Working Drawing Reviews:** Obtain such reviews before custom fabrication is started and before delivery of materials to the project site.
- F. **Coordination:** Coordinate work of this Section with the work of other trades so that construction is not delayed.
- G. **Responsibility for Errors:** Accept responsibility for errors of detailing and fabrication and for the correct fit of the floor grating or floor plate units.
- H. **Remedial Action:** Promptly remove and replace materials, fabrications and workmanship found defective by the Commissioner and provide new acceptable work in accordance with contract requirements at no additional expense to the City of New York.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. **Delivery:** Deliver stainless steel floor grating and floor plate and accessories to the site in an undamaged condition and at such intervals as will avoid delay in the work.
- B. **Handling:** Handle floor grating and floor plate and accessories safely and in a manner that will prevent distortion or other damage. Care shall be exercised at all times to avoid damage through careless handling during transportation, unloading, storing and installation.

1.8 PROJECT CONDITIONS

- A. **Field Measurements:**
 - 1. Prior to commencement of the work, field verify existing dimensions, elevations, locations and conditions applicable to the work. Report variances and discrepancies from the Contract Drawings and potential interferences promptly to the Commissioner.
 - 2. Take sufficient field measurements prior to preparation of Shop and Working Drawings and fabrication of construction materials, where possible, to ensure proper fitting of the work. However, do not delay job progress. Allow for adjustments and fitting wherever the taking of field measurements before fabrication may not be possible or might delay the work.
 - 3. Actual field-verified conditions may require modifications to the fabrication and/or installation details indicated on the Contract Drawings. Perform the work to meet actual field conditions encountered.

B. Openings and Cut-outs:

1. Check dimensions in the field after all piping and equipment are set in place and determine the exact dimensions and locations of openings and cut-outs.
2. Provide templates where required for location and size of openings and cut-outs.

PART 2 - PRODUCTS

2.1 TYPES OF FLOOR GRATING AND FLOOR PLATE

- A. Floor Grating: Unless otherwise shown or specified, floor grating shall be of a type framed with parallel bearing bars and perpendicular cross members at right angles, and shall be the product of one manufacturer. Floor grating with parallel bearing bars and diagonal cross members will not be acceptable. The type of grating specified herein or in other Sections shall be used exclusively throughout the work.
- B. Types of Floor Plate: Floor plate, where indicated on the Contract Drawings, shall be:
1. Non-watertight or gas-tight, fixed cover floor plate.
 2. Watertight or gas-tight, fixed cover floor plate.
 3. Floor plate with a hinged cover.

2.2 MATERIALS

- A. Floor grating, floor plate and appurtenances shall be fabricated of Type 316L stainless steel and shall conform to the requirements specified herein and to the following standards:
1. General Requirements: ASTM A480.
 2. Floor Grating: ASTM A167; ASTM A276; or ASTM A666.
 3. Floor Plate: ASTM A167; or ASTM A793.
 4. Frames, Curb Angles, Braces, Skirt Angles, Bolts and Fastening Devices: ASTM A276; ASTM F593, ASTM F594.

2.3 FLOOR GRATING FABRICATION

- A. Floor Grating (Pressure Locked or Welded) shall consist of parallel bearing bars spaced not more than 1-3/16 inches on centers joined by perpendicular cross members spaced not more than 4 inches on center (unless shown otherwise on the Contract Drawings), to form rectangular openings. Approved welded, electric-forged, slotted, friction fitted or interlocking joints shall be used in joining cross members to the bearing bars to give the grating the required strength, rigidity and durability. The distance between the support and the nearest cross bar shall not exceed 2 inches.
- B. Provide 1-1/4-inch minimum grating depth with bearing bars not less than 3/16 inches thick.
- C. Welded cross members shall not be less than 3/16 inch in thickness. Mechanically interlocked cross members shall not be less than 1/8 inch in thickness. The depth of cross members shall not be less than one-half the depth of the bearing bars, but such depth need not exceed one inch. Riveted cross members shall be as specified for mechanically interlocked cross members.

- D. The tops of the grating bearing bars and cross bars shall be in the same plane.
- E. Each section of grating shall be sized to weigh a maximum of 150 pounds unless noted otherwise on the Contract Drawings or in the Specifications.
- F. Floor grating shall be accurately fabricated, free from warps, twists or other defects which may affect its appearance and serviceability.
- G. Floor grating shall have a mill finish unless otherwise noted herein or on the Contract Drawings.
 - 1. Provide serrated grating or slip-resistant abrasive finish where shown on the Contract Drawings. Depth of serrated grating shall be not less than 1/4 inch greater than required standard bar grating.
- H. Floor Grating Openings and Cut-outs:
 - 1. Provide openings or cut-outs in the floor grating for the passage of pipe, valve stems, columns and similar work.
 - 2. Openings in and edges of all grating sections shall be banded with bearing bars. Where more than two bearing bars are included in the opening or cut-out, banding bars of the same dimensions as the bearing bars shall be provided around the opening and welded or electric-forged to the component parts of the intersecting members.
- I. All welds shall be ground smooth and conform to the requirements of NAAMM MBG 533.

2.4 FLOOR PLATE FABRICATION

A. General

- 1. Provide an approved, slip-resistant surface for floor plate units.
- 2. Provide stiffener angles as required to meet loading and deflection limits specified herein.
- 3. Fabricate all floor plate sections so that no one section will weigh more than 150 pounds. Provide flush type lifting handles for all sections of floor plate.
- 4. Fabricate floor plate sections accurately, free from warps, twists or other defects which may affect the appearance and serviceability of the floor plate.

B. Furnish fixed cover floor plate complete with frames, anchors, lifting handles and stainless steel flush head screw fastenings.

- 1. For watertight and gas-tight checkered plate installations, provide neoprene gasket all around the perimeter and between plate sections as shown on the Contract Drawings.

C. Furnish hinged cover floor plate complete with frames, anchors, lifting handles and heavy duty concealed hinges. Hinges shall be Type 316L stainless steel, with stainless steel pins and fastenings. A minimum of two hinges shall be provided for each checkered plate section.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install floor grating and floor plate with each section readily removable and replaceable. Adjacent units shall be neatly fitted together.
- B. The clearance at the ends or between sections of floor grating and floor plate shall be a maximum of 1/4 inch.
- C. Tops of floor grating and floor plate shall be set flush with surrounding construction.
- D. Floor grating and floor plate shall be set with a full and uniform end bearing on the stainless steel frames to preclude rocking movement. Wedges or similar shimming devices shall not be used.

3.2 FASTENING DEVICES

- A. Install approved fastening devices to hold the floor grating securely and rigidly to the supports with means provided for easy removal.
- B. Fastening devices shall not protrude above the walking surface of the floor grating.
- C. Install fasteners in accordance with the manufacturer's recommendations.

END OF SECTION 05532

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SECTION 05730 – DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide metal fabrications in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Exterior stainless steel cable railings with stainless steel posts.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Stainless Steel: 60 percent of minimum yield strength.

- C. Structural Performance of Handrails and Railings: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections:

1. Top Rail of Guards: Capable of withstanding the following loads applied as indicated:

- a. Concentrated load of 200 lbf applied at any point and in any direction.
- b. Uniform load of 50 lbf/ft. applied horizontally and concurrently with uniform load of 100 lbf/ft. applied vertically downward.
- c. Concentrated and uniform loads above need not be assumed to act concurrently.

2. Handrails Not Serving As Top Rails: Capable of withstanding the following loads applied as indicated:

- a. Concentrated load of 200 lbf applied at any point and in any direction.
- b. Uniform load of 50 lbf/ft. applied in any direction.
- c. Concentrated and uniform loads above need not be assumed to act concurrently.

3. Infill Area of Guards: Capable of withstanding a horizontal concentrated load of 200 lbf applied to 1 sq. ft. at any point in system, intermediate rails, balusters, or other elements composing infill area.

- a. Load above need not be assumed to act concurrently with loads on top rails in determining stress on guard.

D. Thermal Movements: Provide handrails and railings 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, failure of connections, and other detrimental effects. Base engineering calculation on 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.

E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 SUBMITTALS

A. Product Data: Submit manufacturers technical data for manufacturer's product lines of handrails and railings assembled from standard components.

1. Include product data for grout, anchoring cement, and paint products.

B. Shop Drawings: Show fabrication and installation of handrails and railings. Include plans, elevations, sections, details, and attachments to other Work.

1. For installed handrails and railings indicated to comply with design loads, include structural analysis data signed and sealed by the licensed professional engineer responsible for their preparation.

2. Submit detailed drawings showing interface between new railing infill and existing to which it will be installed.

3. Submit details drawn to scale at not less than one inch per foot. Shop drawings shall contain the design, type of material and load assumptions and shall bear the seal of a licensed Professional Engineer registered in the jurisdiction of Project location.

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. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. 6-inch-long sections of each different linear railing member, including handrails, top rails, posts, and balusters.

2. Fittings and brackets.

3. Welded connections.

4. Assembled Samples of railings, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.

5. 12 inch square sample of wire mesh for green railing system, with all required framing and attachments in size and finish to be used for this Project.

D. Product Test Reports: Indicating products comply with requirements, based on comprehensive testing of current products.

1.4 QUALITY ASSURANCE

- A. **Engineer Qualifications:** Professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of the kind indicated for ornamental handrails and railings similar in material, design, and extent to that indicated for this Project and that have a record of successful in-service performance.
- B. **Manufacturer/Fabricator Qualifications:** The Manufacturer or Supplier fabricating the material or equipment described in this Section must, within the last three (3) consecutive years, have successfully completed in a timely fashion projects similar in scope and type to the required work for this Section
- C. **Professional Engineer Qualifications:** A professional engineer who is licensed 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 handrails and railings that are similar to those indicated for this Project in material, design, and extent.
- D. **Testing Agency Qualifications:** An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- E. **Source Limitations:** Obtain each type of railing through one source from a single manufacturer.
- F. **Welding Qualifications:** Qualify procedures and personnel according to the following:
 - 1. AWS D1.6, "Structural Welding Code - Stainless Steel."
- G. **Mockups:** Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockups as shown on Drawings.
 - 2. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches in length.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 STORAGE

- A. Store ornamental handrails and railing systems in clean, dry location, away from concrete and masonry, protected against damage. Provide waterproof covering; allow for air circulation inside the covering.

1.6 PROJECT CONDITIONS

- A. **Field Measurements:** Verify handrail and railing dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide ornamental handrails and railings as scheduled at end of Section. Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.
- B. Stainless Steel:
1. Tubing: ASTM A 554, Grade MT 316.
 2. Pipe: ASTM A 312, Grade TP 316.
 3. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316.
 4. Castings: ASTM A 743, Grade CF 8 or CF 20.
 5. Perforated Stainless Steel: Stainless-steel sheet, ASTM A 240 or ASTM A 666, Type 304/316, minimum 1/8 inch thick, with 1 inch holes in staggered rows.
 6. Cables: 7x19 stainless steel cable, 1/4 inch thick; with a minimum breaking strength of 7000 lb; and is drawn through a die after laying to produce a smooth outer surface, of diameter indicated; made from wire complying with ASTM A 492, Type 316.
 - a. Provide stainless steel rods, turnbuckles adjusters, and clevis, fittings indicated for high strength mechanical fastening and adjusting tension for stainless steel cable railings.
- C. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.
1. Provide cast brackets with flange tapped for concealed anchorage to threaded hanger bolt.
 2. Provide formed or cast brackets with predrilled hole for exposed bolt anchorage.
 3. Provide formed metal brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.
 4. Provide brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

2.2 FASTENERS

- A. 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.
1. Stainless-Steel Components: Type 316 stainless-steel fasteners.
- B. Fasteners for Interconnecting Handrail and Railing Components: Use fasteners fabricated from same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
1. Provide concealed fasteners for interconnecting railing components and for attaching them to other Work, unless otherwise indicated.

- C. **Postinstalled Anchors:** Anchors of type fabricated from 316 stainless steel materials with capability to sustain, without failure, a load equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.3 GROUT

- A. **Nonshrink, Nonmetallic Grout:** Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for exterior applications.

2.4 FABRICATION

- A. Assemble handrails and railings 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 reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- B. Make up cable railing assemblies in the shop to field-measured dimensions with fittings machine swaged. Minimize amount of turnbuckle take-up used for dimensional adjustment so maximum amount is available for tensioning cable railing. Tag cable railing assemblies and fittings to identify installation locations and orientations for coordinated installation.
 - 1. Provide rails and posts/stanchions fabricated stainless steel; with 3/8 diameter holes at ends to connect cable rails.
- C. **Welded Connections:** Where indicated, fabricate handrails and railings for connecting members by welding. Cope components at perpendicular and skew connections to provide close fit, or use fittings designed for this purpose. Weld connections continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- D. **Mechanical Connections:** Where indicated, fabricate handrails and railings by connecting members with railing manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- E. **Brackets, Flanges, Fittings, and Anchors:** Provide scheduled items, or, if not scheduled, manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other construction.
- F. Provide inserts and other anchorage devices to connect handrails and railings to concrete. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. 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 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- I. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. 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 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.

2.6 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of 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 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Corrosion Protection: Coat concealed surfaces of metal that will be in contact with grout, concrete, masonry or dissimilar metals, with a heavy coat of bituminous paint.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. 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.
- C. 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 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.3 CLEANING

- A. Clean stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

3.4 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at 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 05730

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SECTION 06100 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide rough carpentry in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:
1. Wood grounds, nailers, furring and blocking.
 2. Plywood backing panels for equipment.
- B. Related Sections:
1. Division 3, Section "Cast-in-Place Structural Concrete."
 2. Division 3, Section "Precast Concrete Hollow Core Planks" for roof deck.
 3. Division 7, Section "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for roofing membrane.
 4. Division 7, Section "Roof Accessories."

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for manufactured materials, including construction panels.
- B. Material Certificates: Submit listing of species and grade selected and a signed copy of grading rules showing design values for selected lumber. Design values shall comply with specified requirements and American Lumber Standards Committee.
- C. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, and using treated material.
1. Submit certification by treating plant stating type of treatment, preservative retained and conformance with applicable standards.
 2. Submit a statement that moisture content of treated materials complied with levels indicated before delivery.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Stack wood to provide air circulation within and around stacks.

1.4 PROJECT CONDITIONS

- A. Coordination: Fit carpentry work to other work accurately. Correlate location of supports for attachment of other work.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee.
- B. Grade Stamps: Furnish lumber with grade stamp of inspection agency to show compliance with grading rules, and identifying grading agency, grade, species, moisture content and mill.
- C. Provide lumber sizes as required by PS 20, unless otherwise shown.
 - 1. Provide dressed lumber, S4S.
 - 2. Provide seasoned lumber with 15% maximum moisture content.

2.2 MISCELLANEOUS LUMBER

- A. General: Provide wood cants, nailers, blocking, furring, grounds and similar members, of sizes and shapes shown.
- B. Grade: Standard Grade light framing lumber of western or southern species, and Standard Grade boards per WCLIB or WWPA rules.

2.3 CONSTRUCTION PANELS

- A. Construction Panel Standards: Comply with American Plywood Association (APA) "Performance Standard and Policies for Structural-Use Panels", Form No. E445.
- B. Trademark: Factory-mark each construction panel with APA trademark to show compliance with grade requirements.
- C. APA Performance-Rated Panels: Provide APA Performance-Rated Panels of thickness shown and as follows:
 - 1. Plywood Backing Panels: For backing panels where shown, provide fire-retardant treated plywood, APA C-D PLUGGED INT with exterior glue, not less than 3/4 inch thick.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners and Anchorages: Provide size, type, material and finish complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers, anchors and connectors of the size and type recommended by the manufacturer for each use indicated including recommended nails.
- B. Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).
 - 1. Provide galvanized steel connectors, minimum 16 gage, of type and size as recommended by manufacturer for uses indicated.

- C. Building Paper: ASTM D 226, Type I; asphalt saturated felt, non-perforated, 15-lb. type.

2.5 WOOD TREATMENT BY PRESSURE PROCESS

- A. Preservative Treatment: Comply with applicable requirements of AWWA Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark.
 - 1. Pressure-treat above-ground items with water-borne preservatives to comply with AWPB LB-2. After treatment, kiln-dry lumber and plywood to 15% maximum moisture content. Treat the following:
 - a. Wood cants, nailers, curbs, blocking, stripping and sleepers in connection with roofing, flashing and waterproofing.
 - b. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
 - 2. Complete fabrication of treated items prior to treatment, where possible. Coat field cut surfaces with heavy brush coat of same chemical used for treatment and to comply with AWWA M4.
- B. Fire-Retardant Treatment: Comply with State of Code. Pressure impregnate interior lumber and plywood with fire-retardant chemicals to comply with AWWA C20 and C27, respectively. Identify treated lumber with marking of Underwriters Laboratories, Inc., U.S. Testing, or other approved testing and inspecting agency.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard defective materials. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.
- B. Securely attach carpentry work as required by specified standards. Countersink nail heads on exposed carpentry work and fill holes.
- C. Use fasteners of size to not penetrate members to exposed side or into finish materials. Make tight connections; install fasteners without splitting of wood; predrill as required.

3.2 WOOD GROUNDS, NAILERS AND BLOCKING

- A. Provide where shown for screeding or attachment of other work. Shape as shown and locate for true line and level of work to be attached.
- B. Attach to support applied loading. Countersink exposed bolts and nuts flush with surfaces. Where possible, anchor to concrete and masonry during their installation.
- C. Provide permanent grounds of dressed, preservative treated, key-bevelled lumber not less than 1-1/2 inch wide and of thickness to match finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished work.
- B. Provide furring of sizes and spacing as shown on the Drawings.

3.4 INSTALLATION OF CONSTRUCTION PANELS

- A. General: Comply with applicable recommendations contained in Form No. E 30F, "APA Design/Construction Guide - Residential & Commercial."
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Plywood Backing Panels: Screw to supports.

END OF SECTION 06100

SECTION 07124 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Provide EPDM roofing in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Adhered EPDM membrane roofing system.

B. Related Sections:

1. Division 3, Section "Precast Concrete Hollow Core Planks"
2. Division 6, Section "Rough Carpentry" for wood nailers, curbs, and blocking.
3. Division 7, Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
4. Division 7, Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

1. Corner Uplift Pressure: As indicated.
2. Perimeter Uplift Pressure: As indicated.
3. Field-of-Roof Uplift Pressure: As indicated.

- D. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals' markings.
 - 1. Fire/Windstorm Classification: [Class 1A-60] [Class 1A-75] [Class 1A-90] [Class 1A-105] [Class 1A-120].
 - 2. Hail Resistance: [MH] [SH].
- E. Solar Reflectance Index: Not less than [78] [29] when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.
- F. Energy Performance: Provide roofing system that is listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- G. Energy Performance: Provide roofing system with initial solar reflectance not less than 0.70 and emissivity not less than 0.75 when tested according to CRRC-1.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Base flashings and membrane terminations.
 - 2. Roof plan showing orientation of concrete plank roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
- C. Samples for Verification: For the following products, in manufacturer's standard sizes:
 - 1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
 - 2. Termination bars.
 - 3. Battens.
 - 4. Six roof cover fasteners of each type, length, and finish.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. Qualification Data: For qualified Installer and manufacturer.
- F. Manufacturer Certificate: Signed by roofing manufacturer certifying that membrane roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of complying with performance requirements.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- H. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.
- I. Field quality-control reports.

- J. Warranties: Sample of special warranties.
- K. Maintenance Data: For membrane roofing system to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed or FM Approvals approved for membrane roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to furnish manufacturer's special warranty to the City of New York.
- C. Source Limitations: Obtain components including fasteners for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.
- D. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.
 1. Meet with City of New York, Commissioner, City of New York's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 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 requirements for deck substrate conditions and finishes, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

- C. Protect roofing materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with roofing manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes membrane roofing, base flashings, fasteners, roofing accessories, and other components of membrane roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM MEMBRANE ROOFING

- A. EPDM: ASTM D 4637, Type II, scrim or fabric internally reinforced, uniform, flexible EPDM sheet.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle SynTec Incorporated.
 - b. Johns Manville.
 - c. Approved equal.
 - 2. Thickness: 90 mils, nominal.
 - 3. Exposed Face Color: White.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.

- C. Water-Based, Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard water-based, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.
- D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch- wide minimum, butyl splice tape with release film.
- E. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Metal Termination Bars: Manufacturer's predrilled Type 316 stainless-steel bars, approximately 1 by 1/8 inch thick; with anchors.
- H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.
- J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
 - 1. Apply a continuous bead of in-seam sealant before closing splice if required by membrane roofing system manufacturer.
- H. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
- I. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- J. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.4 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: City of New York will engage a qualified independent testing agency to perform inspections.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Commissioner and City of New York.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION 07124

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SECTION 07130 – FOUNDATION WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide foundation waterproofing in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:
1. Modified bituminous sheet waterproofing.
 2. Adhesive-coated HDPE sheet waterproofing.
 3. Filter fabric.
 4. Molded-sheet drainage panels.

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
- B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
- C. Samples: For the following products:
1. 12-by-12-inch square of waterproofing and flashing sheet.
 2. 4-by-4-inch square of drainage panel.
- D. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for waterproofing.
- G. Warranties: Special warranties specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that is approved or licensed by waterproofing manufacturer for installation of waterproofing required for this Project.
- B. Source Limitations: Obtain waterproofing materials, and protection course through one source from a single manufacturer.
- C. Mockups: Before beginning installation, install waterproofing to 100 sq. ft. of permanent below grade wall to demonstrate surface preparation, crack and joint treatment, corner treatment, and execution quality.

1. If Commissioner determines mockups do not comply with requirements, reapply waterproofing and reinstall overlying construction until mockups are approved.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Pre-installation Conference: Conduct conference at Project site.

1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.
- C. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- D. Store rolls according to manufacturer's written instructions.
- E. Protect stored materials from direct sunlight.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.6 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to replace waterproofing material that does not comply with requirements or that fails to remain watertight within specified warranty period.
 1. Warranty does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate exceeding 1/16 inch in width.
 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Installer's Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.
 1. Warranty includes removing and reinstalling protection board, and drainage panels.

PART 2 - PRODUCTS

2.1 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Not less than 60-mil- thick, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated to a 4-mil- thick, polyethylene film with release liner on adhesive side.
1. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. Grace, W. R. & Co.; Bituthene 4000.
 - b. Carlisle Corporation
 - c. American Hydrotech
 - d. Or approved equal
 2. Physical Properties:
 - a. Tensile Strength: 250 psi minimum; ASTM D 412, Die C, modified.
 - b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
 - c. Low-Temperature Flexibility: Pass at minus 20 deg F ; ASTM D 1970.
 - d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836.
 - e. Puncture Resistance: 40 lbf minimum; ASTM E 154.
 - f. Hydrostatic-Head Resistance: 150 feet minimum; ASTM D 5385.
 - g. Water Absorption: 0.15 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
 - h. Vapor Permeance: 0.05 perms; ASTM E 96, Water Method.

2.2 ADHESIVE-COATED HDPE SHEET WATERPROOFING

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide one of the following:
1. Grace, W. R. & Co.; Preprufe 300R.
 2. Carlisle Corporation
 3. American Hydrotech
 4. Or approved equal
- C. Adhesive-Coated HDPE Sheet for Horizontal Applications: 46-mil-thick, uniform, flexible sheets consisting of 30-mil-thick, HDPE sheet coated with a pressure-sensitive rubber adhesive, a protective adhesive coating, a detackifying surface treatment, an uncoated self-adhering side lap strip, and a release liner with the following physical properties:
1. Tensile Strength, Film: 4000 psi minimum; ASTM D 412.
 2. Low-Temperature Flexibility: Pass at minus 10 deg F; ASTM D 1970.
 3. Peel Adhesion to Concrete: 5 lbf/in.; ASTM D 903, modified.
 4. Lap Adhesion: 2.5 lbf/in.; ASTM D 1876, modified.
 5. Hydrostatic-Head Resistance: 231 feet; ASTM D 5385, modified.
 6. Vapor Permeance: 0.01 perms; ASTM E 96, Water Method.
 7. Water Absorption: 0.5 percent; ASTM D 570.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
 - 1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid waterborne primer recommended for substrate by manufacturer of sheet waterproofing material.
- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.
- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, asphalt-modified coating.
- F. Sheet Strips: Self-adhering, rubberized-asphalt sheet strips of same material and thickness as sheet waterproofing.
- G. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.
- H. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
 - 1. Thickness: 1/8 inch, nominal, for vertical applications; 1/4 inch, nominal, elsewhere.
 - 2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for type of protection course.

2.4 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side with or without a polymeric film bonded to the other side of a studded, non-biodegradable, molded-plastic-sheet drainage core, with a vertical flow rate of 9 to 15 gpm per ft.
 - 1. Product: Provide Hydroduct 220 as manufactured by Grace, W.R. & Co., or Commissioner approved equal.
 - 2. Filter Fabric: Manufacturer's standard nonwoven geotextile fabric of polypropylene or polyester fibers, or a combination of them.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
 - 1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
 - 2. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 3. Verify that compacted subgrade is dry, smooth, and sound; and ready to receive adhesive-coated HDPE sheet.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- F. Bridge and cover expansion joints with overlapping sheet strips.
 - 1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.
- G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
 - 1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:
 - a. At footing-to-wall intersections, extend liquid membrane each direction from corner or install membrane strip centered over corner.
- H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET WATERPROOFING APPLICATION

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and according to recommendations in ASTM D 6135.

- B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.
 - 1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.
- D. Two-Ply Application: Install sheets to form a membrane with lap widths not less than 50 percent of sheet widths to provide a minimum of 2 thicknesses of sheet membrane over areas to receive waterproofing.
- E. Horizontal Application: Apply sheets from low point to high point of decks to ensure that side laps shed water.
- F. Apply continuous sheets over sheet strips bridging substrate cracks, construction, and contraction joints.
- G. Seal exposed edges of sheets at terminations not concealed by metal counterflashings or ending in reglets with mastic.
- H. Install sheet waterproofing and auxiliary materials to tie into adjacent waterproofing.
- I. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.
- J. Install protection course with butted joints over waterproofing membrane immediately.
 - 1. Insulation drainage panels may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.
- K. Correct deficiencies in or remove sheet waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

3.4 ADHESIVE-COATED HDPE SHEET WATERPROOFING APPLICATION

- A. Install adhesive-coated HDPE sheets according to manufacturer's written instructions.
- B. Place and secure molded-sheet drainage panels over substrate. Lap edges and ends of geotextile to maintain continuity.
- C. Vertical Applications: Install adhesive-coated HDPE sheet with HDPE face against substrate. Accurately align sheets and maintain uniform 3-inch-minimum lap widths and end laps. Overlap and seal seams and stagger and tape end laps to ensure watertight installation. Mechanically fasten to substrate.
 - 1. Securely fasten top termination of membrane with continuous metal termination bar anchored into substrate and cover with detailing tape.

- D. Horizontal Applications: Install adhesive-coated HDPE sheet with HDPE face against substrate. Accurately align sheets and maintain uniform 3-inch-minimum lap widths and end laps. Overlap and seal seams. Overlap, stagger, and seal end laps with detail tape to ensure watertight installation.
- E. Corners: Seal lapped terminations and cut edges of sheet waterproofing at inside and outside corners with detail tape.
- F. Seal penetrations through sheet waterproofing to provide watertight seal with detail tape patches or wraps and a liquid-membrane troweling.
- G. Install sheet waterproofing and auxiliary materials to produce a continuous watertight tie into adjacent waterproofing.
- H. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Tape perimeter of damaged or nonconforming area extending 6 inches beyond repaired areas in all directions. Apply a patch of sheet waterproofing and firmly secure with detail tape.
- I. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

3.5 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. General: Install according to manufacturer's written instructions as indicated. Coordinate placement with foundation waterproofing.
 - 1. Comply with manufacturer's written instructions for securing drainage panels to substrate. Use adhesives and mechanical fasteners recommended by manufacturer. Lap edges of fabric and extend fabric around foundation drainage pipe according to manufacturer's recommendations. Protect installed panels during backfilling.
- B. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesives that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
 - 1. Do not use drainage panels as protection for waterproof membrane unless approved by factory-authorized service representative of waterproofing membrane manufacturer. Submit approval if so used.
- C. Place initial backfill material over compacted drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Final backfill to finish elevations and slope away from building.

3.6 FIELD QUALITY CONTROL

- A. Engage a full-time site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions; surface preparation; membrane application, flashings, protection, and drainage components; and to furnish reports to Commissioner.

3.7 PROTECTION AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect installed drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where drainage panels will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07130

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide sheet metal flashing and trim in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:
1. Counter flashing and base flashing.
 2. Custom formed stainless steel copings.
 3. Exposed metal trim.
 4. Miscellaneous sheet metal accessories.
- B. Related Sections:
1. Division 3, Section "Cast-In-Place Structural Concrete."
 2. Division 6, Section "Rough Carpentry."
 3. Division 7 Section "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing."
 4. Division 7 Section "Joint Sealants."
 5. Division 8 Section "Overhead Coiling Doors."

1.2 PERFORMANCE REQUIREMENTS

- A. General: Manufacture and install manufactured copings and counterflashings to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Manufacture and install roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
1. Design Pressure: As indicated.
- C. Thermal Movements: Provide manufactured copings and counterflashings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base engineering calculation on 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. Water Infiltration: Provide manufactured roof specialties that do not allow water infiltration to building interior.
- E. Copings: Capable of resisting Wind Zone 1 forces according to FMG Loss Prevention Data Sheet 1-49.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of custom formed copings, sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
1. Details for fastening, joining, supporting, and anchoring of the coping assemblies including fasteners, clips, cleats, and attachments to adjoining work.
 2. Details for expansion and contraction.
 3. Identification of material, thickness, weight, and finish for each item and location in Project.
 4. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 5. Details for joining, supporting, and securing sheet metal flashing, counterflashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 6. Details of termination points and assemblies, including fixed points.
 7. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
 8. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
 9. Details of special conditions.
 10. Details of connections to adjoining work.
- C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Copings and Counterflashings: 12 inch lengths of full-size components including fasteners, cover joints, accessories, and attachments.
 2. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
 3. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
 4. Accessories and Miscellaneous Materials: Full-size Sample.
- E. Qualification Data: For qualified fabricator.
- F. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, verifying compliance of copings with performance requirements.

H. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Welding: Qualify welding processes and operators in accordance with AWS D1.6 "Stainless Steel Welding Code".
- B. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- C. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Commissioner specifically approves such deviations in writing.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Pre-installation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

1.6 COORDINATION

- A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.7 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. High Performance Finish: 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. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide pre-manufactured flashing by one of the following:
 - 1. Afco Products Inc.
 - 2. Phoenix Building Products.
 - 3. Sandell Manufacturing Co., Inc.
 - 4. M&M Systems Corp.
 - 5. Approved equal.

2.2 EXPOSED METALS

- A. Provide gauges as required to result in exposed flashing and sheet metal work free from physical defects; including, but not limited to oil-canning, water leakage and similar conditions.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 316, finish and gauge as indicated on the Drawings.
- C. Prepainted, Zinc-Coated Steel Sheet: ASTM A 653/A 653M, G90 coating designation, structural quality, and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Surface: Smooth, flat finish, unless otherwise indicated.

2.3 CONCEALED METALS

- A. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 316.
- B. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

2.4 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
- B. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape.
- C. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.

- D. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7, Section "Joint Sealants."
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- H. Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior nonmoving joints including riveted joints.
- I. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.
- J. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

2.5 CUSTOM FORMED COPINGS

- A. Copings: Provide a custom fabricated break formed coping system consisting of a stainless steel sheet-metal in section lengths not exceeding 12 feet, concealed anchorage, concealed splice plates with same finish as copings, mitered corner units, and end cap units.
 - 1. Copings: Fabricated from the following exposed metal:
 - a. Stainless Steel: 16 gage (minimum); unless greater thickness required to resist deformation and oil-canning.
 - 2. Corners: Factory fabricated; mitered and continuously welded corners.
 - 3. Snap-on Coping Anchor Plates: Concealed, stainless steel sheet, 12 inches wide, 0.028 inch thick, with integral cleats.
 - 4. Face Leg Cleats: Concealed, continuous stainless steel.

2.6 COUNTERFLASHINGS

- A. Available Manufacturers:
 - 1. Castle Metal Products.
 - 2. Fry Reglet Corporation.
 - 3. MM Systems Corporation.
 - 4. Commissioner approved equal.
- B. Counterflashings: Manufactured units in lengths not exceeding 12 feet designed to snap into reglets and compress against base flashings with joints lapped, from the following exposed metal in thickness indicated:

1. Stainless Steel: Minimum 0.0250 inch thick.
2. Prepainted, Zinc-Coated Steel: 0.028 inch thick.

C. Accessories: Counterflashing wind-restraint clips.

2.7 FABRICATED UNITS

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- D. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.
- E. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer.
- F. Formed Units: Fabricate formed running units with formed or extruded joint covers for installation behind main members where possible. Fabricate mitered and welded corner units in the shop prior to installation. Field fabricated corners and compound shapes will not be acceptable.
 1. Provide custom fabrications, and flashing of the gauge and finish as indicated.
 2. Provide all stiffeners, anchors and accessories.

2.8 TRIM FABRICATION

- A. Formed Units: Provide exterior trim comprised of formed stainless steel sheet. Provide formed stainless steel metalwork; worked to the profiles and arrangements indicated. Provide concealed stainless steel anchor plates or cleats located at all running joints, and at other locations required to properly secure flashing/closure assemblies to the supporting construction/substrates.
 1. Provide running units with sufficient lap to prevent the penetration of storm driven water.
 2. Custom formed assemblies shall be equipped with concealed splice plates.
 3. Prefabricated all inside and outside corners of custom fabricated closures; miter joints and provide continuous welds. Avoid exposed fasteners to the greatest extent possible.

2.9 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. 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.

2.10 STEEL FINISHES

- A. High Performance Finish: Refer to Division 9, Section "High Performance Coating" for regulations and requirements.

2.11 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Unless otherwise indicated, grind and polish surfaces to produce uniform finish indicated, free of cross scratches.
- C. Finish: Satin, non-directional No. 4 finish.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
 - 1. Examine walls, roof edges, and parapets for suitable conditions for formed metal copings.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION REQUIREMENTS

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.

- B. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
- C. Install counterflashing in manner and by methods indicated. Where shown in concrete, furnish reglets as required.
- D. Install counterflashing in either by snap-in seal arrangement or by welding in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.
- E. Ease edges of flashing where field cutting is required. Refinish edges where exposed (if finish is damaged).
- F. Flashing System: Install items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer. Coordinate flashing installation with roof and wall system installation.

3.3 METAL TRIM AND CUSTOM ASSEMBLIES

- A. Metal trim shall be formed as indicated.
- B. Exterior face shall have an exposure as indicated, interior face shall have exposure as indicated on Drawings.
- C. Joints shall have a 1/4 inch gap and joined with a 6 inch wide splice plate centered under the coping joints at approx. 12'-0" o.c.
 - 1. Apply a butyl seal strips at each coping end joint.
- D. Provide fabricated corner sections shall have a minimum 18-inch face length in each direction.

3.4 CUSTOM FORMED COPINGS

- A. General: Install formed metal copings according to manufacturer's written instructions; and the approved Shop Drawings. Anchor copings securely in place and capable of resisting forces specified in performance requirements. Use concealed fasteners, separators, sealants, and other miscellaneous items as required to complete coping systems.
 - 1. Install copings with provisions for thermal and structural movement.
 - 2. Torch cutting of custom fabricated stainless steel copings is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of stainless-steel copings with bituminous coating where in contact with ferrous metal, or cementitious construction.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Install custom formed copings level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.

- D. Install copings to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
- E. Expansion Provisions: Provide for thermal expansion of exposed copings. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.
- F. Fasteners: Use stainless steel, concealed-type fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches for nails.
- G. Seal joints with elastomeric or butyl sealant on concealed surfaces to ensure assemblies remain permanently watertight.
- H. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners as indicated on the approved Shop Drawings.
- I. Anchor copings to resist uplift and outward forces according to performance requirements.
 - 1. Interlock back leg drip edges into continuous cleats anchored to substrate at 16-inch centers.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. At the completion of the Work, visually inspect the Work and touch up mars, scratches, cut edges and other surface or edge imperfections to match original specified finish. All new metal surfaces shall be free of dents, creases, and waves.
- C. Replace flashing and sheet metal work that have become damaged, marred, contain any aesthetic or structural imperfections or deemed unacceptable by the Commissioner.
- D. Protection: Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

END OF SECTION 07620

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SECTION 07720 – ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide roof accessories in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Preformed flashings.

- B. Related Sections:

1. Refer to Division 15 for exhaust and intake fans.

1.2 SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.

- C. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.
2. Method of attaching roof accessories to roof or building structure.
3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

- D. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
 - 1. With Commissioner's approval, adjust location of roof accessories that would interrupt roof drainage routes and roof expansion joints.

1.7 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL MATERIALS

- A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coated.
 - 2. Exposed Finishes: High Performance Coating. Refer to Division 9, Section "High Performance Coating" for finishes and requirements.
 - a. Color and Gloss: As selected by Commissioner from manufacturer's full range.
- B. Stainless-Steel Shapes or Sheet: ASTM A 240/A 240M or ASTM A 666, Type 316.
- C. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized to comply with ASTM A 123/A 123M, unless otherwise indicated.
- D. Steel Tube: ASTM A 500, round tube, baked-enamel finished.
- E. Galvanized Steel Tube: ASTM A 500, round tube, hot-dip galvanized to comply with ASTM A 123/A 123M.

2.2 MISCELLANEOUS MATERIALS

- A. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

- B. Polyethylene Sheet: 6-mil- thick, polyethylene sheet complying with ASTM D 4397.
- C. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
 - 1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft..
- D. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.
- E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- F. Elastomeric Sealant: ASTM C 920, silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, and heavy bodied for hooked-type expansion joints with limited movement.
- H. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.3 PREFORMED FLASHINGS

- A. Exhaust Vent Flashings: Double-wall metal flashing sleeve, urethane insulation filled, with integral deck flange, 12 inches high, with removable metal hood and slotted metal collar, and as follows:
 - 1. Metal: Stainless steel, Type 316 unless otherwise indicated.
 - 2. Diameter: As indicated.
- B. Vent Stack Flashing: Metal flashing sleeve, with integral deck flange, uninsulated, and as follows:
 - 1. Metal: Stainless steel, Type 316 unless otherwise indicated.
 - 2. Height: 7 inches.
 - 3. Diameter: As indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
 - 2. Verify dimensions of roof openings for roof accessories.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Install roof accessories to fit substrates and to result in watertight performance.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.
- D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
- E. Preformed Flashing Installation:
 - 1. Secure to roof membrane according to vent and stack flashing manufacturer's written instructions.
- F. Seal joints with butyl sealant as required by manufacturer of roof accessories.

3.3 TOUCH UP

- A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 9 coating Sections.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.4 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07720

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide joint sealants in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Joint sealants for the following applications:

- a. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:
- 1) Construction joints in cast-in-place concrete.
 - 2) Joints between cast-in-place architectural concrete units.
 - 3) Joints between different materials listed above.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior and exterior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 13-mm- wide joints formed between two 150-mm- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- G. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer indicating that sealants will not stain or damage concrete. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.
- H. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** One who has successfully completed within the last three years similar joint sealer applications.
- B. **Source Limitations:** Obtain each type of joint sealant through one source from a single manufacturer.
- C. **Product Testing:** Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period preceding the Notice to Proceed with the Work.
 - 1. **Testing Agency Qualifications:** An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
 - 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
 - 3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.
 - 4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- D. **Mockups:** Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:
 - 1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.
- E. **Preinstallation Conference:** Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 5 deg C.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. **Special Installer's Warranty:** Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. **Warranty Period:** Two years from date of Substantial Completion.

- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.
- C. Manufacturers: Subject to compliance with requirements provide one of the following:
 - 1. Dow Corning Corp
 - 2. Tremco, Inc.
 - 3. Pecora Corp.
 - 4. or approved equal

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: Match Commissioner's samples.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

- B. **Stain-Test-Response Characteristics:** Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. **Suitability for Immersion in Liquids.** Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. **Single-Component Nonsag Urethane Sealant:**
 - 1. Type and Grade: S (single component) and NS (nonsag).
 - 2. Class: 25.
 - 3. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 - 4. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Galvanized steel, granite and marble.
- E. **Single-Component Nonsag Urethane Sealant:**
 - 1. Type and Grade: S (single component) and NS (nonsag).
 - 2. Class: 25, 50, or 100/50.
 - 3. Use Related to Exposure: NT (nontraffic).
 - 4. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Galvanized steel, granite and marble.
- F. **Single-Component Pourable Urethane Sealant:**
 - 1. Class: 25 or 50.
 - 2. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 - 3. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Galvanized steel, granite, or marble.
- G. **Multicomponent Nonsag Immersible Urethane Sealant:**
 - 1. Type and Grade: M (multicomponent) and NS (nonsag).
 - 2. Class: 25.
 - 3. Uses Related to Exposure: NT (nontraffic) and I (immersible), Class 1 or 2.
 - 4. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- H. **Multicomponent Pourable Immersible Urethane Sealant:**
 - 1. Type and Grade: M (multicomponent) and P (pourable).
 - 2. Class: 25.
 - 3. Uses Related to Exposure: NT (nontraffic) and I (immersible), Class 1 or 2.
 - 4. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated], and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 32 deg C. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 3. Remove laitance and form-release agents from concrete.
- B. **Joint Priming:** Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. **Masking Tape:** Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. **General:** Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. **Sealant Installation Standard:** Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. **Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.**
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. **Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.**
- E. **Install sealants using proven techniques that comply with the following and at the same time backings are installed:**
 1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Installation of Preformed Tapes: Install according to manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 1 test for each 300 m of joint length thereafter or 1 test per each floor per elevation.
 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, Method B, Exposed Surface Finish Hand Pull Tab, Method C, Field-Applied Sealant Joint Hand Pull Flap or Method D, Water Immersion in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
 4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free of voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
 5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

- B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07920

SECTION 08331 – OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide overhead coiling doors in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:
1. Overhead coiling service doors.
 2. Operation of overhead coiling doors include the following:
 - a. Electric operation.
 3. Provide complete operating door assemblies including door curtains, guides, counterbalance mechanism, hardware, operators, and installation accessories.
- B. Related Sections:
1. Division 5, Section "Metal Fabrications."

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design overhead coiling doors, including comprehensive engineering analysis by a qualified professional engineer, licensed in the State of New York, using performance requirements and design criteria indicated.
- B. Structural Performance, Exterior Doors: Exterior overhead coiling doors shall withstand the wind loads, the effects of gravity loads, and loads and stresses within limits and under conditions indicated according to SEI/ASCE 7.
1. Wind Loads: Uniform pressure (velocity pressure) of 30 lbf/sq. ft., acting inward and outward.
 2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
- C. Operability Under Wind Load: Design overhead coiling doors to remain operable under uniform pressure (velocity pressure) of 30 lbf/sq. ft. wind load, acting inward and outward.
- D. Operation Cycles: Provide overhead coiling door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

1.3 SUBMITTALS

- A. **Product Data:** For each type and size of overhead coiling door and accessory. Include the following:
1. Construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. **Shop Drawings:** For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 2. Show locations of replaceable fusible links.
 3. **Wiring Diagrams:** For power, signal, and control wiring.
- C. **Samples for Initial Selection:** Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
1. Include similar Samples of accessories involving color selection.
- D. **Samples for Verification:** For each type of exposed finish required, prepared on Samples of size indicated below.
1. **Curtain Slats:** 12 inches long.
 2. **Bottom Bar:** 6 inches long with sensor edge.
 3. **Guides:** 6 inches long.
 4. **Brackets:** 6 inches square.
 5. **Hood:** 6 inches square.
- E. **Delegated-Design Submittal:** For overhead coiling doors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation and licensed in the State of New York.
1. Summary of forces and loads on walls and jambs.
- F. **Qualification Data:** For qualified Installer.
- G. **Maintenance Data:** For overhead coiling doors to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** Manufacturer's authorized representative with a minimum of 3 years experience with installation of the type of overhead coiling door specified, and is trained and approved for installation of units required for this Project.
- B. **Source Limitations:** Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling door manufacturer.

C. 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.

1.5 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer and installer agrees to repair or replace overhead coiling door assemblies that fail in materials or workmanship within specified warranty periods.

1. Warranty Period: Provide the following:

- a. Balance/tension springs and door, motors and other components for five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Stainless-Steel Door Curtain Slats: ASTM A 666, Type 316; sheet thickness of 0.025 inch and as required to meet requirements.
2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face.
3. Vision-Panel Glazing: Manufacturer's standard clear glazing, fabricated from transparent acrylic sheet or fire-protection rated glass as required for type of door; set in glazing channel secured to curtain slats.

B. Endlocks and Windlocks for Service Doors: ASTM A 666, Type 316; castings as required for application, and secured to curtain slats with Type 316 stainless steel rivets. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Bottom Bar for Service Doors: Consisting of two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from stainless steel extrusions to match curtain slats and finish.

D. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.2 HOOD

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Stainless Steel: 0.025-inch- thick stainless-steel sheet, Type 316, complying with ASTM A 666.

2.3 LOCKING DEVICES

- A. Chain Lock Keeper: Suitable for padlock.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.4 CURTAIN ACCESSORIES

- A. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

1. Provide pull-down straps or pole hooks for doors more than 84 inches high.

2.5 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. Spring Balance: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.6 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
1. Comply with NFPA 70.
 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door Operator Location(s): Operator location indicated for each door.
1. Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.
- D. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Division 16 Section "Electric Motors" unless otherwise indicated.
1. Electrical Characteristics:
 - a. Phase: Poly phase.
 - b. Volts: 208 V, unless otherwise indicated on Electrical Drawings.
 - c. Hertz: 60.
 2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
 3. Motor Size: Minimum size as indicated on the Drawings. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
 4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 5. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Device: Equip motorized door with indicated external automatic safety sensor capable of protecting full width of door opening.
- G. Remote-Control Station: Momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."

1. Interior units, full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with interior and exterior hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
- K. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with regulatory requirements for accessibility.

2.7 DOOR ASSEMBLY

- A. Coiling Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Model SD3016-ADF-SS as manufactured by McKeon Door Company or equal products by one of the following:
 - a. Cookson Company.
 - b. Alpine Overhead Doors, Inc
 - c. Mahon Door Corporation.
 - d. Overhead Door Corporation.
- B. Operation Cycles: Not less than 100,000.
 1. Include tamperproof cycle counter.
- C. Door Curtain Slats: Flat profile slats of 3 inch wide by 7/8 inch deep.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 1. Perform installation and startup checks according to manufacturer's written instructions.
 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train City of New York's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 08331

SECTION 08391 - FLOOD BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide flood barriers in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. Multiple section flood barrier.

B. Related Sections:

1. Division 3, Section "Cast-in-Place Structural Concrete" for coordination of installation embedded anchor channels, anchor points, splice brackets and flush sills.
2. Division 7, Section "Concrete Paving Joint Systems" for coordination of installation with paving joint systems.
3. Division 7, Section "Joint Sealants" for applicable joint sealants.
4. Division 8, Section "Overhead Coiling Doors" for coordination of installation of flood barriers with overhead coiling doors.

1.2 SYSTEM DESCRIPTION

- A. Provide manually operated flood barriers designed and manufactured to perform under hydrostatic loads indicated or perform to manufacturers' criteria; whichever is greater.

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's product data, installation instructions and Drawings detailing installation procedure.
- B. Calculations: Submit calculations approved by a qualified engineer, licensed in the State of New York, to verify the flood barrier's ability to withstand the design loading indicated.
- C. Shop Drawings: Provide Shop Drawings showing layout, profiles, and product components, including anchorage, hardware, and finishes. Include dimensional plans, applicable material specifications, elevations and sections detailing mounting and connections, and load diagrams.
- D. Closeout Submittals: Provide Operation and Maintenance data to include methods for maintaining installed products, precautions against cleaning materials and methods detrimental to finishes and performance.

1.4 QUALITY ASSURANCE

- A. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of flood barrier panels.
- B. Manufacturer's Qualifications: Manufacturer must demonstrate a minimum of three (3) years successful experience in design and manufacture of similar flood related closures.

- C. Source Limitations: Obtain flood barriers assemblies from single manufacturer.
- D. Welder Qualifications: Welders Certified in accordance with American Welding Society Procedures: AWS-1-GMAW-S, WPS No. B2.004.90 for applicable material used in production of specified product.

1.5 DELIVER, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged shipping container with identification labels intact.
- B. Store all materials according to manufacturer's written instructions in a dry, controlled area to protect from elements and damage. If outdoor storage is required, block materials to store at an incline, to prevent pooling of any moisture and promote runoff.
 - 1. Do not tarp tightly, as this will entrap moisture. Instead, tarp materials in a tent-like arrangement, elevated above the product with open sides to allow airflow.
 - 2. Store all other hardware in a dry controlled environment.
- C. Use caution when unloading and handling product to avoid bending, denting, crushing, or other damage to the product.
 - 1. When using forklifts, use forks of proper length to fully support product being moved.
 - 2. Consult drawings or factory for proper lift points.

1.6 WARRANTY

- A. Special Warranty:
 - 1. Manufacturer warrants this product and components to be free from manufacturing defects for a period of One (1) year from date of shipment.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Model "FP-530 Multi-Span" flood barrier as manufactured by PR Doors, or an equal approved by the Commissioner.

2.2 PERFORMANCE REQUIREMENTS

- A. Special Loading: Flood barriers shall be designed to withstand a full head of water equal to the height of the flood barrier over the entire opening without leaking or permanent deformation.
- B. Sealing Requirements: Flood barrier and gasket design to provide an effective barrier against short-term high water situations, to the protection level indicated on Drawings.
- C. Operational Requirement: Latching operable from one (1) side only (typical).

- D. Mounting/Load Transfer: Anchor to existing structure. Flood barrier designed for loads as indicated and will transfer loads to adjacent structure. Frames to be cast-in-place or anchored utilizing mechanical, chemical or other anchor types as designed. Manufacturer to include all anchors, water-stop, and sealants, as designed, for bolt-in place applications.
- E. Loading Direction Selection: Reverse pressure loading.
 - 1. Material Requirements: As specified herein.
- F. Design safety factor for all flood barrier models of a minimum 2:1. Based on material yield strengths.
- G. Design safety factor for anchors, minimum of 4:1 for cast-in-place concrete.
- H. Provide rectangular door opening with square corners to facilitate easy passage.
- I. Provide compression gasket which requires no inflation.

2.3 COMPONENTS

- A. Panel: Flood barrier panels and frame, including jambs, heads, thresholds, and sill members shall be fabricated or formed from stainless steel of appropriate gauge, size and strength, and welded construction as required for loading and as follows:
 - 1. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 316L.
 - 2. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.
- B. Gaskets to be factory mounted to flood barrier assembly. Gaskets to be compressible rubber type, typically EPDM unless otherwise noted, and to be field replaceable.
- C. Frame mounting hardware includes anchors, sealant, and water stop, as designed and provided for by manufacturer.
- D. Manual Operating Hardware: To be custom sized for the size and weight of the flood barrier and loads. Hardware to be factory located on jambs and barrier panels, as practical. All loads shall be transferred to building structure. Provide latching hardware as indicated on the Drawings. Flood barrier panel to be factory prepared for applicable latching devices.
- E. Labeling. Each flood barrier and frame will be individually identified for matched installation.
- F. Instruction Placard: Provide pictorial and written operation instruction placards on flood barrier.

2.4 FABRICATION

- A. Construct floor barrier panel to provide an effective watertight seal.
- B. Flood barrier frame shall have suitable anchors for embedment in concrete.
- C. The sealing surfaces shall be machined to ensure a watertight seal.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Compliance: Comply with all manufacturer's product data, including installations instructions, reference drawings, shipping, handling, and storage instructions, and product carton instructions for installation.

3.2 INSTALLATION/APPLICATION

- A. Install flood barrier in compliance with manufacturer's written instructions, shop drawings, and details. Frames shall be installed level, square, plumb, and rigid. Required tolerances to be no greater than 1/16" variation over entire length of frame members or sill member.
- B. Frame to be installed as recommended by manufacturer and in accordance with manufacturer's installation instructions and drawings.
- C. Sealants, water-stop, and grouting to be applied per product application directions and in accordance with manufacturer's instructions.
- D. Field grouting to be completed by appropriate personnel, and in accordance with product application directions and manufacturer's instructions.
- E. Tolerances: All dimensional requirements shall be in accordance with manufacturer's installation instructions and Shop Drawings.
- F. Field Testing: Perform visual dry test for gasket alignment, continuity contact and pre-compression, or construct temporary water barrier and test installed flood barrier.

3.3 FIELD QUALITY CONTROL

- A. Installation: Install flood barrier in compliance with manufacturer's instructions and approved Shop Drawings.
- B. Field Tests/Installation Verification:
 - 1. Products shall be operated and field to verify the sealing surfaces maintain contact at the correct sealing points.
 - 2. Hinging and latching assemblies operate freely and correctly.
 - 3. Verify all anchorage is in accordance with manufacture's installation instructions and applicable data sheets.

3.4 CLEANING

- A. Repair or replace damaged installed products or components.
- B. Clean all sealing surfaces.
- C. Touch up damaged finish.

3.5 PROTECTION

- A. Protect installed product and finish surfaces from damage during handling, storage, and installation.
- B. Protect installed product and finish surfaces during normal and general operation.

END OF SECTION 08391

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SECTION 08620 - UNIT SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide unit skylights in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:
 - 1. Unit skylights mounted on site-built curbs.
- B. Related Sections:
 - 1. Division 2, Section "Unit Pavers."
 - 2. Division 3, Section "Precast Concrete Hollow Core Planks."
 - 3. Division 7, Section "EPDM Roofing."
 - 4. Division 7, Section "Roof Accessories."

1.2 PERFORMANCE REQUIREMENTS

- A. AAMA/WDMA Performance Designation: Provide unit skylights capable of complying with performance requirements indicated, based on testing manufacturer's unit skylights that are representative of those specified and that are of minimum test size indicated below:
 - 1. Size required by AAMA/WDMA 101/I.S.2/NAFS for gateway performance for both gateway performance and optional performance grade.
 - 2. Size: Indicated on Drawings.
- B. AAMA/WDMA Performance Requirements: Provide unit skylights of performance class and grade indicated that comply with AAMA/WDMA 101/I.S.2/NAFS unless more stringent performance requirements are indicated.
 - 1. Performance Class and Grade: As indicated.
- C. Windborne-Debris-Impact-Resistance Performance: Provide unit skylights that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 or AAMA 506.

1.3 SUBMITTALS

- A. Product Data: For each type of unit skylight indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for unit skylights.
- B. Shop Drawings: For unit skylight work. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.
- C. Samples for Initial Selection: For unit skylights with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in a representative section of each unit skylight in manufacturer's standard size.

- E. Product Schedule: For unit skylights. Use same designations indicated on Drawings.
- F. Qualification Data: For qualified Installer and manufacturer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency for each type, performance class, performance grade, and size of unit skylight. Test results based on use of downsized test units will not be accepted.
- H. Maintenance Data: For unit skylights to include in maintenance manuals.
- I. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating unit skylights that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- B. Installer Qualifications: An installer acceptable to unit skylight manufacturer for installation of units required for this Project.
- C. Source Limitations: Obtain unit skylights from single source from single manufacturer.
- D. Surface-Burning Characteristics of Plastic Glazing: Provide plastic glazing sheets identical to those tested for fire-exposure behavior per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Self-Ignition Temperature: 650 deg F or more for plastic sheets in thickness indicated when tested per ASTM D 1929.
 - 2. Smoke-Production Characteristics: Comply with either requirement below:
 - a. Smoke-Developed Index: 450 or less when tested per ASTM E 84 on plastic sheets in manner indicated for use.
 - b. Smoke Density: 75 or less when tested per ASTM D 2843 on plastic sheets in thickness indicated for use.
 - 3. Burning Characteristics: Tested per ASTM D 635.
- E. Unit Skylight Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
 - 1. Provide AAMA-certified unit skylights with an attached label.
- F. Preinstallation Conference: Conduct conference at Project site.

1.5 COORDINATION

- A. Coordinate unit skylight flashing requirements with roofing system.

- B. Coordinate sizes and locations of site-built curbs with actual unit skylights provided.
- C. Provide anchors and inserts to be placed in adjacent construction in proper sequence so as not to delay the Work.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Uncontrolled water leakage.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - c. Deterioration of insulating-glass hermetic seal.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Skylites Inc.
 - 2. Bristolite Skylights.
 - 3. O'Keeffe's Inc.
 - 4. Traco, Skytech Systems, Inc.
 - 5. Wasco Products, Inc.

2.2 MATERIALS

- A. Insulating Glass: Clear, sealed units in manufacturer's standard overall thickness.
 - 1. Exterior Lite: 1/4-inch clear fully tempered glass.
 - 2. Interior Lite:
 - a. Laminated glass; 2 plies of 1/8-inch clear heat-strengthened glass with 0.030-inch clear polyvinyl butyral interlayer.
 - b. 1/4-inch clear fully tempered glass.
 - 3. Interspace Content: Air.
 - 4. Low-Emissivity Coating: Manufacturer's standard.
- B. Glazing Gaskets: Manufacturer's standard.
- C. Integral Curb: Reinforced-thermoset-fiberglass profile, self-flashing type.

- D. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 316L.
- E. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.
- F. Fasteners: Type 316 nonmagnetic stainless steel.

2.3 INSTALLATION MATERIALS

- A. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic, nominally free of sulfur and containing no asbestos fibers, formulated for 15-mil dry film thickness per coating.
- B. Joint Sealants: As specified in Division 7 Section "Joint Sealants."
- C. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- D. Roofing Cement: ASTM D 4586, asbestos free, designed for trowel application or other adhesive compatible with roofing system.

2.4 UNIT SKYLIGHTS

- A. General: Provide factory-assembled unit skylights that include glazing, with stainless steel glazing retainers, gaskets, and inner frames and that are capable of withstanding performance requirements indicated.
- B. Integral Curb: Reinforced-thermoset-fiberglass profile, self-flashing type.
- C. Unit Shape and Size: As indicated.
- D. Protective Screens: Manufacturer's standard to protect personnel from falls.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend 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. Directional Polish: No. 4 satin finish.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with unit skylight installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate installation of unit skylight with installation of substrates, vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.
- B. Comply with recommendations in AAMA 1607 and with manufacturer's written instructions for installing unit skylights.
- C. Install unit skylights level, plumb, and true to line, without distortion.
- D. Anchor unit skylights securely to supporting substrates.
- E. Where metal surfaces of unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by unit skylight manufacturer.
- F. Set unit skylight flanges in thick bed of roofing cement to form a seal unless otherwise indicated.
- G. Where cap flashing is indicated, install to produce waterproof overlap with roofing or roof flashing. Seal with thick bead of mastic sealant except where overlap is indicated to be left open for ventilation.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: City of New York will engage a qualified testing agency to perform tests and inspections.
- B. After completion of installation and nominal curing of sealant and glazing compounds but before installation of interior finishes, test for water leaks according to AAMA 501.2.
- C. Perform test for total area of each unit skylight.
- D. Work will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 CLEANING

- A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes.
- B. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

END OF SECTION 08620

SECTION 09960 – HIGH PERFORMANCE COATING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Provide high performance coatings in accordance with the Contract Documents. The "General Conditions" shall apply to all work under the Contract. The Work of this Section shall include, but not be limited to, the following:

1. This Section includes surface preparation and field application of high-performance coating systems to items and surfaces as follows:

a. Exterior Substrates (Gates, Overhead Coiling Doors, Beams):

1) Galvanized steel.

b. Interior Substrates:

- 1) Galvanized Steel- Overhead Door Framing, and steel plates, bars, angles, anchor rods/bolts used as part of roof support structure:
- 2) High Performance Coatings- Roof Steel Plate Girders/Beams with welded plate attachments, and bottom surfaces of roof's Precast Concrete Hollow Core Planks.

B. Related Sections:

1. Division 3, Section "Precast concrete Hollow Core Planks.
2. Division 5, Section "Structural Steel" for structural steel.
3. Division 5, Section "Metal Fabrications."
4. Division 7, Section "Sheet Metal Flashing and Trim" for trims.

1.2 DEFINITIONS

A. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

B. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of coating system and in each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.

4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
 3. VOC content.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Commissioner will select one surface to represent surfaces and conditions for application of each coating system specified in Part 3.
 - a. Commissioner will designate extent and items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Commissioner at no added cost to City of New York.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Commissioner specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. Provide products of same manufacturer for each coat in a coating system.

B. Colors: As selected by Commissioner from manufacturer's full range.

2.2 PRIMERS

A. Metal Primers: MPI #20; Coordinate with Division 5 Section "Structural Steel" for factory application for the primer as follows:

1. Products: subject to compliance with requirements, provide one of the following:
 - a. Tnemec.; Series 1 Omnithane Primer- 2.5 to 3.5 mils dry Thickness
 - b. Carboline; Cabozinc 859 Primer- 3 to 5 mils dry thickness
 - c. International; Interzinc 52 Primer- 2 to 3 mils dry thickness
 - d. Or Equal

B. Concrete Primers: Coordinate with Division 3 Section 03411-" Precast Concrete Hollow Core Planks" apply primer coating to the bottom surfaces of the planks .

1. Products : Subject to compliance with requirements provide one of the following:
 - a. Tnemec; Series 218 Mortarclad
 - b. Carboline; Sanitile 600 TG
 - c. International; Ceilcote 680
 - d. Or Equal

2.3 INTERMEDIATE COATINGS

A. Polyamide Epoxy, Cold-Cured, Gloss: MPI #77.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Tnemec; Series N69F Hi-Build Epoxyline II, 4 to 6 mils dry thickness
 - b. Carboline; Carboguard 890, 5 to 8 mils dry thickness
 - c. International; Interzone 954, 10 to 12 mils dry thickness
 - d. Or Equal.

2.4 FINAL OR FINISH COATINGS

A. Polyamide Epoxy, pigmented, Gloss: MPI # 72.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Tnemec; Series N69F Hi-Build Epoxyline II, 4-6 mils

- b. Carboline; Carboguard 890, 5 to 8 mils dry thickness
- c. International; Interzone 954, 10 to 12 mils dry thickness
- d. Or Equal

2.5 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Comissioner from manufacturer's full range.

2.6 COLD-APPLIED JOINT SEALANTS

- A. Multicomponent, Nonsag, Traffic-Grade, Polysulfide Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolastic Polysulfide Sealant.
 - b. Pecora Corporation; Synthacalk GC-2+.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 3. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- 1. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

D. Steel Substrates: Coordinate with Division 5 Sections for shop prep as follows:

1. Remove rust and loose mill scale.
2. Clean using methods recommended in writing by coating manufacturer.
3. Blast clean according to SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."

E. Concrete Substrates: Coordinate with Division 3 for surface preparation and provide as follows:

1. Remove dirt, dust, oil, laitance, curing agents from the concrete substrate. The concrete substrate is required to be cured for minimum of 28 days, surface rubbed to fill holes and dry with moisture limitations as set by the primer/coating manufacturer requirements before application of primer/coatings.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions.

1. Use applicators and techniques suited for coating and substrate indicated.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. City of New York reserves the right to invoke the following procedure at any time and as often as City of New York deems necessary during the period when coatings are being applied:

1. City of New York will engage the services of a qualified testing agency to sample coating material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance with specified requirements.
3. City of New York may direct Contractor to stop applying coatings if test results show materials being used do not comply with specified requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Comissioner, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION 09960

SECTION 13210 – UNDERGROUND STORAGE TANKS

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:

1. Underground storage tanks (UST) and its associated piping shall be provided to store rain water collected from the roof and as shown in the contract drawing

B. Governing Standards:

1. AWWA D-100-5
2. UL-58

1.2 SUBMITTALS

- A. Submit shop drawings and accessory cut sheets for approval. The UST design drawings shall show principal dimensions, size, type and locations of all connections and pumps/fittings/control panel and locations of all options/ accessories. Design drawings shall also include UST catalog cuts, and vendor cuts for associated accessory items and subassemblies.

- B. Submit copies of the system installation, operation and maintenance manual prior to UST delivery.

- C. Submit copies of all quality control testing documentation, installation inspection documentation, and written warranty to the Commissioner at time of documentation completion. Quality Control Submittals: Submit the following:

1. Manufacturer's certified performance and material records as specified.
2. Manufacturer's certified copies of Field Test Reports.

1.3 QUALITY ASSURANCE

- A. Manufacturer shall have a minimum of 3 years experience in producing similar equipment and shall show evidence of installations in satisfactory operation. No subcontracting of tank fabrication by the manufacturer shall be permitted.

- B. Installer shall be a licensed NYC tank installer having a minimum of 3 years experience in installing similar equipment and shall show evidence of installations in satisfactory operation.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Use every precaution to prevent damage to the equipment during transportation and delivery to the site.
 - 1. Do not allow equipment to be dropped, bumped, dragged, pushed, rolled or moved in any way which will cause damage.
 - 2. If, in the process of transportation or handling, any equipment is damaged, replace or repair such equipment or accessories. Make all required repairs.
- B. Handling of UST shall be by lifting lug only – chains or cables shall not be wrapped around tank.
- C. Provide temporary storage of UST on site prior to installation in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow. Materials shall be protected from extreme heat and direct sunlight.
- D. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the job-site before being incorporated into the work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Equipment products of other manufacturers may be submitted for approval.
 - 1. Underground Storage Tanks:
 - a. Highland Tank
 - b. Xerxes
 - c. Or approved equal
 - 2. Accessories:
 - d. Highland Tanks
 - e. Xerxes
 - f. Or approved equal

2.2 UNDERGROUND STORAGE TANKS

- A. General: Provide a single wall, 6000 gallon underground steel storage tank, HighDRO Rainwater Collection Tank RCT-6000 manufactured by Highland Tank or approved equal.
 - 1. Provide a polyurethane coated carbon steel underground storage tank, as shown and specified herein. Tank storage volume shall be as shown in Contract Drawings and tank shall be designed for underground storage of storm water.
 - 2. Tanks shall comply with UL 58, Type 1 construction and NYC standards.

3. The tank, including all accessories, shall be installed in strict accordance with the manufacturer's recommendations and applicable fire and environmental codes.
4. Tanks shall be manufactured with coated carbon steel, minimum of 1/4" thick.
5. Tank shall be capable of being buried in ground with seven (7) feet of overburden over the top of the tank.
6. Tank with cover shall withstand surface H-25 axle loads.
7. Tanks shall include 24" diameter manway, 36"X36" square grade level manway as shown on contract drawings, complete with gaskets, bolts and cover.

B. Accessories:

1. Anchor Straps:

- a. Straps shall be polyester anchor straps as supplied by tank manufacturer.
- b. Number and location of straps shall be as specified by tank manufacturer.

2. NPT Threaded Fittings:

- a. All standard threaded fittings shall be half-couplings and shall be 4" or 6" diameter. Reducers shall be used to connect to smaller diameter pipes.
- b. NPT fittings shall withstand a minimum of 150 foot-pounds of torque and 1000 foot-pounds of bending, both with a 2:1 safety factor.

3. Submersible Pumps - Provide a complete pumping system with the pump control panel with NEMA 4X enclosure, two non-mercury float switches, level gauge transducer and all necessary fittings for use with the system. The pump provided shall be a pump with a design flow of 50 gpm at a TDH of 14 ft. The impeller size shall be 78 mm. The motor shall be 3 Phase 208 V 60 Hz of 1.8 hp with a rated speed of 3345 rpm. Discharge of the pump shall be directed to the manhole shown on the contract drawing.

2.3 SYSTEM CONTROL

- A. Control Panel: Provide prewired alarm/control panel for the tank. The control panels shall be NEMA 4X. Power to the control panels is to be 120-volt, single phase.

B. Control Panel includes the following:

1. UL approved, side-hinged NEMA 4X, gasketed, watertight, locking enclosure to be mounted on the wall of the building.
2. Submersible pump controls:
 - a. 1 Manual magnetic starters with overload and low voltage protection.
 - b. Digital controller with level display, 2 push buttons ("On" and "Silence") , 2 red indicating lights ("High Level", "Pump Off"), 1 green indicating light ("Pump On")
 - c. High level light, automatic lockout on low level.
 - d. 1 Manual reset buttons (3-coil overload).

e. Common alarm horn

Control strategy: The pump is manually started by pressing "Pump On" button on the control panel. "Run" light is on while pump is running. Pump will be automatically shut off with the low level float switch. When the pump is off, "Pump Off" light comes on. The tank water level is displayed through the digital control display in the panel. When the level reaches the high level float, the "High Level" indicating light comes on. The alarm horn is activated when the level is high and the alarm horn can be shut off with "Silence" button.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Where a conflict exists between manufacturer's instructions and those listed herein, manufacturer's installation instructions shall take precedence, although the Contractor must notify the Commissioner of conflict and action(s) taken. The Contractor shall also comply with the New York City Construction Codes.
- B. Testing: Prior to installation, visually inspect and pressure test the tanks at job site to confirm tank integrity. This is in addition to testing performed by manufacturer, and is to confirm that tanks were not damaged during transit. Perform an air pressure test in the presence of the Commissioner at an internal pneumatic pressure of 5 psig. Paint all joints, seams, and connections with a soap solution, and hold the test pressure without a leak for at least one hour. In the event of test failure, the Contractor is prohibited from performing any repairs. The tanks manufacturer must be contacted to provide repairs.
- C. Hold Down System: Provide a tank hold down system as specified and in accordance with manufacturer's recommendations.
- D. Piping and Accessories: Install all piping connections and accessories, as specified or shown on Contract Drawings, in accordance with respective manufacturer's recommendations.
 - 1. Provide vents to atmosphere for the inlet, manways, and outlet where indicated on Contract Drawings. The manway vents can be manifolded together to one common vent line. Inlet and outlet vents must have separate, dedicated vent lines.
 - 2. Prior to installation of piping, inspect all openings to assure that the dielectric nylon bushings are in place.
- E. Back Fill: Tanks shall be enclosed in vaults as shown in contract drawings. Space between tanks and vaults shall be filled with backfill per manufacturer's recommendations
- F. Access Covers: Provide heavy duty, waterproof, H-25 rated, metal access covers for the tank manways as shown on the Contract Drawings.

3.2 TESTING

- A. Tanks shall be tested according to manufacturer's guidelines at time of installation.
- B. Contractor shall individually test tanks for leakage prior to installation.
- C. **Manufacturer's Services:** The Contractor shall retain the services of the supplier to supervise and/or perform checkout and start-up of all system components. As part of these services, the supplier shall include for those equipment items not manufactured by him, the services of an authorized manufacturer's representative to check the equipment installation and place the equipment in operation. The manufacturer's representative shall be thoroughly knowledgeable about the installation, operation and maintenance of the equipment.
- D. A factory trained representative shall be present at the first tank filling.

END OF SECTION 13210

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SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Mechanical sleeve seals.
5. Sleeves.
6. Equipment installation requirements common to equipment sections.
7. Painting and finishing.
8. Concrete bases.
9. Supports and anchorages.

1.2 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, and crawlspaces.
- 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 duct shafts.
- 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.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Transition fittings.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Escutcheons.

B. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. 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.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

1.6 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 15 piping sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

- A. Refer to individual Division 15 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, 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, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.3 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
1. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser Industries, Inc.; DMD Div.
 - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.
 2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
 3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
 4. Aboveground Pressure Piping: Pipe fitting.

2.4 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 minimum working pressure at 180 deg F.

1. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.

- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150 psig minimum working pressure as required to suit system pressures.
 1. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.

- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 1. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

- F. Dielectric Couplings: Galvanized-steel coupling with inert and non-corrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
 1. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - a. Calpico, Inc.
 - b. Lochinvar Corp.

- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

1. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.

2.5 MECHANICAL SLEEVE SEALS

- A. Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 1. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.

2.6 SLEEVES FOR PIPES

- A. Sleeves and materials for sealing sleeves for gas piping through exterior walls and floor slabs on earth shall be as specified and approved by the Gas Company.
- B. Sheet metal sleeves shall be 20 gauge.
- C. Pipe sleeves shall be service weight cast iron pipe or schedule 40 galvanized steel pipe.
- D. Fire stop penetration materials for sealing sleeves shall be listed by Underwriters Laboratories and shall have Material and Equipment Acceptance (MEA) approval. The materials shall be as specified in Division 7 Section "Fire-Resistive Joint Materials" of Contract 1 - General Construction.
- E. Material for sealing spaces between pipe and sleeve through all walls below and above grade shall be Roxtec Sealing System as manufactured by; Roxtec International. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve. Links shall be loosely assembled with bolts to form a continuous rubber bolt around the pipe with a pressure plate under each bolt head and nut.
- F. Materials for sealing space between each pipe and sleeve through non-fire rated exterior walls above grade shall be Non-shrinking cement
- G. Waterproof sleeves shall be Roxtec Sealing System as manufactured by Roxtec International or approved equal.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 15 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 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. Sleeves for Pipes:
 - 1. General: All plumbing pipes passing through floors, roofs, walls, partitions, furring, beams, trenches, and wherever else indicated on drawings shall be provided with sleeves installed and maintained by the Contractor. Core drilled holes shall be provided with sleeves. Where plumbing pipes pass through potentially wet floors that do not have membrane waterproofing such as toilet rooms, janitor's sink closet, mechanical equipment rooms, pipe chases and areas that are provided with fire protection sprinkler systems, the Contractor shall install sleeves of galvanized steel pipe with welded clips or equivalent at bottom ends for securing sleeves to form work and shall project one inch above finished floors, and shall be caulked watertight.
 - 2. For interior walls and floors and for pipes through roof, the space between each installed pipe and its sleeve shall be sealed with a three hour rated fire stop penetration material. Fire stop materials shall be installed in accordance with the instructions of the manufacturer.

3. Sheet Metal Sleeves:

a. Sleeves for pipes passing through floors, partitions, hung or furred ceilings shall be installed with 1/2" maximum clearance all around pipes. Each sleeve for a pipe passing through an interior floor slab shall be fitted with a one-inch flange, or equivalent, at the bottom end for the purpose of securing it to the form work or sheet metal deck. The sleeve shall finish flush with the top of the finished floor. Sleeves for pipes passing through partitions, hung or furred ceilings shall be of one piece construction and shall finish flush with the finished surface.

b. Sleeves installed for pipes passing through vent ducts shall be securely fastened, soldered and made airtight.

4. Pipe Sleeve: Install pipe sleeves for pipes passing through roofs, concrete beams, brick walls, foundation walls and floor slabs on earth. Sleeves shall be installed with 1/2" maximum clearance all around pipe and shall finish flush with the surfaces penetrated. Pipe sleeves for pipes through roof shall be made of service weight cast iron only.

M. Verify final equipment locations for roughing-in.

3.2 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 15 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.

3.3 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. Install flanges, in piping NPS 2½ and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.4 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 mechanical 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.

3.5 PAINTING

- A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.7 CUTTING AND PATCHING

- A. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
 - 1. Uncover Work to provide for installation of ill-timed Work.
 - 2. Remove and replace defective Work.

3. Remove and replace Work not conforming to requirements of the Contract Documents.
 4. Remove samples of installed Work as specified for testing.
- B. Cut, remove, and properly dispose of selected mechanical equipment, components, and materials as indicated. Included are the removal of mechanical items indicated to be removed and items made obsolete by the new Work. Deliver all removed serviceable apparatus to the City as directed.
 - C. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
 - D. Provide and maintain adequate temporary partitions or dust barriers that prevent the spread of dust and dirt to adjacent areas.

END OF SECTION 15050

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SECTION 15051 – DUCTILE IRON PIPE

PART 1 - GENERAL

1.1 SUMMARY

- A. Requirements for providing ductile iron pipe, fittings and specials.
- B. Ductile iron pipe and fittings shall be furnished and installed complete with all necessary jointing materials, wall castings, wall sleeves, specials, couplings, hangers, supports, anchors, adapters, identification signs, and other appurtenances as shown on the Contract Drawings and as required for a complete installation.
- C. The Contractor shall provide all labor and materials for making connections to existing lines or lines installed under other contracts, including all specials required to connect pipe of dissimilar materials.
- D. Related Sections:
 - 1. Division 2 Section "Installation of Buried Pipelines."
 - 2. Division 2 Section "Leakage Tests."
 - 3. Division 3 Section "Cast-in-Place Structural Concrete."
 - 4. Division 15 Section "Hangers and Supports."
 - 5. Division 15 Section "Piping Insulation."
 - 6. Division 15 Section "Interior and Exposed Piping Schedules."

1.2 REFERENCES

- A. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
- B. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems
- C. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3 inches through 48 inches, for Water and Other Liquids
- D. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- E. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
- F. AWWA C150 - Thickness Design of Ductile Iron Pipe
- G. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast, for Water
- H. AWWA C153 - Ductile-Iron Compact Fittings, 3 inches through 24 inches and 54 through 64 inches, for Water Service
- I. AWWA C606 - Grooved and Shouldered Joints

- J. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners
- K. ASTM B98 - Copper Silicon Alloy Rod, Bar and Shapes
- L. ASTM C283 - Resistance of Porcelain Enameled Utensils to Boiling Acid
- M. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings
- N. DIPRA - Handbook of Ductile Iron Pipe
- O. NY Spec 24-C-38 - Caulking
- P. New York City Construction Codes
- Q. New York Department of Environmental Protection (NYCDEP) Bureau of Water Supply Standard Water Main Specifications

1.3 DESIGN AND MANUFACTURING REQUIREMENTS

- A. Ductile iron pipe shall conform to the American National Standards Institute (ANSI) and American Water Works Association (AWWA) Standards specified herein and recommendations as given in the Ductile Iron Pipe Research Association (DIPRA) "Handbook of Ductile Iron Pipe." Ductile iron pipe for City water shall conform to the rules and regulations of the New York City Construction Codes and the NYCDEP Bureau of Water Supply; requirements contrary to such rules and regulations specified herein shall be disregarded.

1.4 SUBMITTALS

- A. Provide all submittals in accordance with Division 1.
- B. Obtain from the piping manufacturer and submit the following data:
 - 1. Shop Drawings.
 - 2. Results of Certified Shop Tests.
 - 3. Certified Letters of Compliance.
- C. Shop Drawings shall include, but not be limited to:
 - 1. Catalog data consisting of specifications, illustrations and a parts schedule that identifies the materials to be used for the various piping components and accessories. The illustrations shall be in sufficient detail to serve as a guide for assembly and disassembly.
 - 2. Complete layout and installation drawings, including plans, sections and cross-sections showing elevations with clearly marked dimensions. Piece numbers, which are coordinated with the tabulated pipe layout schedule, shall be clearly marked. Scale and size of the drawings shall conform to the General Conditions and Division 1. Piping layout drawings shall indicate information on pipe supports, location, support type, hanger rod size, insert type and the load in pounds.
 - 3. Details of pipe lining, coating, wrapping, insulation and painting of all pipe.

4. Weights of all component parts.
5. Tabulated pipe layout schedule shall include the following information for all pipe and fittings: service, pipe size, working pressure, joint type, wall thickness, piece number and laying length.
6. Flexible couplings, with harness details if required.
7. Locations where pipe and valve identification signs will be placed.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Special care in handling shall be exercised during delivery, storage and handling of pipe to avoid damage and setting up stresses. Damaged pipe will be rejected and shall be replaced at the Contractor's expense. Pipe and specials stored prior to use shall be stored in such a manner to keep the interior free from dirt and foreign matter.
- B. No material furnished under this specification shall be shipped to the job site until all submittals have been approved.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Manufacturers of equivalent product may be submitted for approval.
 1. Ductile-Iron Pipe and Fittings:
 - a. American Cast Iron Pipe Company.
 - b. McWane Incorporated.
 - c. United States Pipe and Foundry Company.
 - d. Griffin Pipe Products, Incorporated.
 2. Ductile-Iron Retainer Glands:
 - a. Nappco, Inc. Series 1246.
 - b. Ebba Iron, Inc., Series 100.
 3. Sleeve-Type Couplings:
 - a. 12-inches in diameter and smaller:
 - 1) Dresser Industries, Style 153.
 - 2) Smith-Blair, Type 441 Omni Coupling System.
 - b. larger than 12-inches in diameter:
 - 1) Dresser Industries, Style 38.
 - 2) Smith-Blair, Type 411.

c. Gaskets:

- 1) Dresser Plain Grade 27.
- 2) Smith-Blair 003.

4. Restrained Push-On Joints:

- a. United States Pipe and Foundry, TR Flex.
- b. McWane Incorporated, Super-Lock.
- c. American Cast Iron Pipe Company, Lok-Ring or Flex-Ring.
- d. Griffin Pipe Products, Incorporated, Snap-Lok.

5. Gaskets:

- a. John Crane, Inc.
- b. Garlock Packing Company.
- c. U.S. Rubber Company.
- d. American Cast Iron Pipe Company.
- e. United States Pipe and Foundry Company.
- f. McWane Incorporated.

6. Coatings and Linings:

- a. Kop-coat.
- b. Tnemec.
- c. American Cast Iron Pipe Company.
- d. United States Pipe and Foundry Company.

2.2 MATERIALS

A. General:

1. Pipe shall be in accordance with AWWA C151 for push-on, restrained joint, or mechanical joint pipe and AWWA C115 for flanged pipe and shall be of grade 60 42 10 ductile iron. The above standards cover ductile iron pipe with nominal pipe sizes from three (3) inches up to and including sixty four (64) inches in diameter. Pipe thickness shall be designed in accordance with AWWA C150.
2. Provide pipe of the various sizes and classes as specified in the pipe schedules or shown on the Contract Drawings. See Division 2 Section "Installation of Buried Pipelines" and Division 15 Section "Interior and Exposed Piping Schedule" for pipe schedules. Provide minimum Thickness Class 53 for pipe with threaded flanges.

B. Fittings:

1. Fittings shall be ductile iron and shall be in accordance with AWWA C110. Any other fittings, not included in AWWA C110, shall conform in design and performance to the requirements of this Standard.
2. Blind, filler, companion and reducing flanges shall conform to ANSI/ASME B16.1.
3. Where compact fittings are shown or indicated, items shall be in accordance with AWWA C153.

C. Flanged Joints:

1. Threaded Flanges: Shall be solid, threaded, ductile-iron, flanges meeting the requirements of AWWA C115. Threaded flanges and pipe shall be assembled and faced by the pipe manufacturer; field or shop assembly will not be accepted. Threaded flanges shall be screwed on tight without overstressing the threads and, when properly assembled, shall be concentric with the pipe.
2. The dimensions of all flanges for pipe fittings and specials and the number and sizes of bolts, up to and including 54 inches, shall be in accordance with ANSI B16.1, Class 125 standard flanges.
3. For pipe larger than 54 inches, flanged pipe shall have ANSI Class 125 flanges integrally cast solid and at right angles to the pipe axis, and accurately faced and drilled smooth and true. Flange bolt holes shall be backfaced or spot-faced as required by ANSI specifications.
4. Flanges shall be tapped where tap or stud bolts are required.
5. Bolts: Bolts shall be in accordance with Appendix A of AWWA C115 and as follows: Flanged joints shall be made with bolts or stud-bolts with a nut on each end. Bolts, stud-bolts and nuts shall be ANSI heavy dimension, semi-finish, with square heads and cold-punched hexagonal nuts. For bolts 1-3/4 inches in diameter and larger, stud-bolts shall be used. Bolt size shall be American Standard for ANSI Class 125 flanges. Where flanged joints are in manholes or submerged in tanks, bolts, stud-bolts, and nuts shall be silicon bronze, ASTM B98, Alloy A, of dimensions and sizes equal to steel bolts, stud-bolts, and nuts specified in Appendix A of AWWA C115.
6. Gaskets: Flange gaskets shall be in accordance with Appendix A of AWWA C115. They shall be full-face gaskets for flanged joints on 12-inch diameter and smaller pipe and shall be of the ring type for flanged joints on larger pipe.
7. After each flanged joint has been made, all bolt heads and nuts, and all surfaces of the flanges not to be painted shall be given two coats of asphaltic coating meeting the requirements of AWWA C151.

D. Grooved-Type Joints shall be in accordance with AWWA C606 and Division 15 Section "Pipe Couplings."

E. Mechanical and Push-On Type Joints:

1. Shall be in accordance with AWWA C111.
2. Restrained push-on joints for water lines shall comply with NYCDEP Bureau of Water Supply Standard Water Main Specifications.

F. Flanged Adaptors:

1. Bolt hole and bolt patterns shall conform to the mating flange patterns as specified in the piping paragraphs. Bolts, nuts, and flange gaskets shall conform to the specifications for the adjacent piping.
2. Shall have ductile iron bodies.
3. Shall be Models 912 as manufactured by Rockwell Industries or equivalent models by Dresser, Clow, or approved equal.
4. Shall have a rated working pressure of 175 psig.

5. Pipe shall be anchored by using anchor studs drilled into the coupling and connected pipe for nominal pipe size twelve (12) inches and smaller. For nominal pipe sizes over twelve (12) inches, pipe shall be restrained by harnesses or pipe supports as specified for sleeve type couplings.

G. Harnesses:

1. Where shown, specified or required, harnesses for pipe with mechanical joints shall be provided.
2. For ductile-iron pipe and fittings with mechanical joints that require harnessing, restrained type mechanical joint pipe will be considered as an alternate upon submission to the Commissioner for approval.
3. Joint assemblies shall be designed to resist pullout of the joints at the test pressures specified for the piping system.

H. Sleeves:

1. Sleeves shall be in accordance with AWWA C110. They shall be of ductile iron and shall be provided at all points where pipes will pass through walls and floors and where wall or floor castings are not provided. Unless otherwise shown, sleeves shall have intermediate collars not less than 1/2-inch thick and 1-1/2 to 2 inches high located at the center of the wall.
2. For exterior walls of structures, wall sleeves shall be plain ends and of flush wall design.

I. Sleeve-Type Couplings:

1. Pipe and fittings for use with sleeve-type flexible couplings shall be plain end.

J. Wall Castings, Connecting Pieces, and Special Fittings:

1. Wall castings and connecting pieces shall be in accordance with AWWA C110, 250 psi pressure rating, unless specified otherwise. Concrete encased wall castings connected to sluice gates and valves shall be cast from alloy iron, Ni-Resist Type 1, International Nickel Co. or approved equal. Wall castings and connecting pieces shall be furnished with ANSI Class 125 flanged ends, bell ends, flare ends and/or spigot ends where shown, specified or required.
2. Wall castings shall be of standard wall pipe dimensions, unless piping layout precludes their use, in which case special castings shall be furnished.
3. Design of Specials: Special fittings where required shall be of an approved design that meet the same specifications and have the same diameters and thicknesses as standard fittings. Any tees, crosses, elbows, laterals, reducers or other fittings of current ANSI or AWWA standard dimensions are not considered specials.
4. Intermediate Collar: Wall castings shall have an integrally cast intermediate collar not less than 1/2-inch thick and 1-1/2 to 2-inches high located at the center of the wall unless otherwise shown.
5. Where space limitations prevent the use of through bolts for assembling flange connections, stud bolts shall be provided on wall casting flanges.

K. Cleanouts:

1. Cleanouts shall be furnished and installed where shown or specified.
2. Size: Cleanout openings shall be not less than 6 inch diameter for pipe 8 inches in diameter or larger. For pipe 6 inches in diameter or smaller, they shall be of the same diameter as the pipe.
3. Cleanout Covers: Cleanout covers which are blind flanges shall be in accordance with AWWA C110, except where conformation is required with the inside curvature of the pipe, in which case the covers shall be flanged plugs of proper shape with American Standard flange drilling.
4. Covers shall be fastened by means of steel studs and bronze nuts and shall be drilled and tapped for a 1-1/2-inch diameter pipe connection.
5. Flange plugs shall be equipped with a dowel or other suitable means to provide proper setting.
6. See more details in Specification Section 02504.

L. Coatings and Linings:

1. Cement Lining: All ductile-iron pipe and fittings shall be furnished with a cement-mortar lining not less than twice the standard thickness and seal coating meeting the requirements of AWWA C104.
2. Exterior Primer: Pipe and fittings shall be shop coated on the outside in accordance with Division 9 Section "High Performance Coating" for use in exposed locations, such as inside buildings or exterior locations where finish painting or insulating is required.
3. Painting: Pipe and fittings shall be painted in accordance with Division 9 Section "High Performance Coating".
4. Asphaltic Coating: Pipe and fittings that will not be exposed to view shall be coated with the standard asphaltic outside coating specified in AWWA C151, at twice the specified thickness. Unlined pipe shall be coated with the standard asphaltic inside coating specified in AWWA C151.
5. Epoxy and Urethane Coatings: Epoxy and urethane coatings shall be applied in accordance with Division 9 Section "High Performance Coating".
6. Polyethylene Encasement: Where ductile iron pipe is in contact with soils, the pipe shall be encased in polyethylene film in accordance with AWWA C105 to isolate the pipe surface from contact with the soils.
7. Concrete Encased Pipe: Pipe and fittings which are to be encased in concrete where watertightness is to be obtained shall not be coated or painted on the outside.
8. Labels: In addition to the information required to be cast onto the pipe by AWWA C151, the letters "N.Y.C." shall be painted on the outside of each pipe, fitting, and special casting.
9. Pipe Couplings: Where flexible or rigid couplings are to be used, the exterior coating on the ends of pipe and fittings shall be left off for approximately eight inches, but the interiors shall be lined throughout.
10. Flange Joints: The back of the flanges and bolt holes shall be coated with asphaltic coating meeting the requirements of AWWA C151/A21.51, Section 51-8.1, immediately after facing and drilling.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All ductile iron pipe and fittings shall be installed in accordance with the manufacturer's recommendations, approved shop drawings and as specified in Division 2 Section "Installation of Buried Pipelines" and Division 15 Section "Interior and Exposed Piping Schedule."
- B. Where insulation is shown or specified, it shall be installed after the installation and testing of the pipe and accordance with Division 15 Section "Piping Insulation."
- C. Where field cutting of ductile iron pipe is permitted by the Commissioner, ductile iron pipe shall be cut only by means of abrasive saws, hack saws, wheel type cutters or milling type cutters. The use of "squeeze" type pipe cutters and cutting torches will not be permitted. Also, the use of diamond points and dog chisels will not be permitted.
- D. Erecting Exposed Piping: All piping shall be erected to accurate lines and grades, permanently supported as shown, specified or required. Where temporary supports are used during construction, sufficient strength and rigidity shall be provided to prevent shifting or distortion of the pipe.
- E. Supports for Exposed Piping: All exposed pipe, fittings and special castings not in trench or beneath floor structures shall be supported in conformance with Division 15 Section "Hangers and Supports."
- F. Supports for Piping Below Floors: Pipe which run beneath ground floors of plant structures shall be encased in concrete to form an integral part of the floor slab or be suspended from the floor slab by approved pipe hangers encased in concrete.
 - 1. Where pipe are contiguous with floor structures, the pipe shall be encased in concrete. The reinforcement in the floor slab shall be placed and bent so that the pipe encasement is an integral part of the concrete structure.
 - 2. Where pipe are below floor structures, the pipe shall be supported by concrete encased adjustable clevis hangers anchored to the floor by means of bearing plates. Supports shall conform to the requirements of Division 15 Section "Hangers and Supports." Hangers shall be spaced not more than five feet apart.
 - 3. Concrete for encasement shall be class 40 conforming to the requirements of Division 3 Section "Cast-in-Place Structural Concrete." There shall be a 3-inch minimum depth of concrete between reinforcement and pipe or hanger components, and a 3-inch minimum depth covering on reinforcement.
- G. Expansion: Ample provisions for flexibility in all pipelines shall be made to compensate for expansion.
 - 1. Adequate expansion devices shall be provided to allow the lines to expand and contract freely without damage to any part of the piping system.
 - 2. Expansion couplings shall be adjusted after installation so that the pipelines will be fluid-tight through the full range of operating conditions.
- H. Venting: All pipelines for liquids with air or gas shall be furnished with vent valves at all high points in the lines. Vent valves shall be of an approved design and adequately sized. Where

vent valves are located that liquids can discharge and cause damage to a structure or equipment, pipe shall be piped from the vent valve to the nearest gutter or drain in an approved manner.

I. Temporary Bulkheads:

1. Temporary bulkheads shall be furnished at the ends of pipe sections where adjoining pipe have not been completed and are not ready to be connected.
2. All temporary bulkheads shall be removed when they are no longer needed.

3.2 LEAKAGE TESTS

- A. All pipes shall be flushed and cleaned after installation.
- B. Pipes shall be tested for leaks in accordance with Division 2 Section "Leakage Tests."

3.3 SCHEDULES

- A. Refer to the Schedules contained in Division 2 Section "Installation of Buried Pipelines" and Division 15 Section "Interior and Exposed Piping Schedule" for information on the piping that is to be constructed using the pipe materials and methods specified herein.

END OF SECTION 15051

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SECTION 15060 – HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Contractor shall provide all hangers, supporting devices and appurtenances shown, specified or required for pipes, fittings, valves and other in-line equipment.
- B. Included in this classification are rod hangers; clevis hangers, spring hangers; stanchion, roller and pipe pole supports and saddle stands; supports of structural steel; concrete saddles, concrete anchor blocks and bases, and all necessary guides, restraints, fastening devices, anchor bolts, pipe anchors and appurtenances.
- C. Contractor shall provide all temporary pipe supports required during construction.
- D. Contractor shall design all piping support systems in accordance with the requirements of this Specification unless otherwise shown or specified.
- E. Related Sections:
 - 1. Division 5 Section "Metal Fabrications."
 - 2. Division 15 Section "Interior and Exposed Piping Schedules"

1.2 REFERENCES

- A. The Manufacturers Standardization Society of the Valve and Fitting Industry:
 - 1. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture
 - 2. MSS SP-69 - Pipe Hangers and Supports - Selection and Application
 - 3. MSS SP-89 - Pipe Hangers and Supports - Fabrication and Installation Practices
 - 4. MSS SP-90 - Guidelines on Terminology for Pipe Hangers and Supports
- B. Federal Specification, FS W-H-171 - Hangers and Support, Pipe
- C. Underwriter's Laboratories, Inc., Standard UL-203 - Pipe Hanger Equipment
- D. ASTM A 36 - Standard Specification for Carbon Structural Steel
- E. ASTM A 48 - Standard Specification for Gray Iron Castings
- F. ASTM A 276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes
- G. ASTM A283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars
- H. ASTM A778 - Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products

- I. ASME - B31.1 - Power Piping
- J. N.Y. Spec 32-P-6 - Pipe, Special Castings, Valve Box Castings: Cast-Iron
- K. New York City Building Code 2008, Section 1621 and ASCE 7-02, Section 9.6
- L. EJMA - Expansion Joint Manufacturers Association

1.3 DESIGN REQUIREMENTS

- A. Contractor shall provide hangers and supports of sufficient strength to maintain the pipelines and appurtenances in proper position and alignment under all operating conditions.
- B. Seismic forces, developed in accordance with New York City Building Code 2008, Section 1621 and ASCE 7-02, Section 9.6. Refer to the General Structural Notes on the Structural Drawings for site and structure specific seismic design criteria.
- C. Contractor shall provide the services of a New York State Licensed Professional Engineer to design the supports for all pipelines and appurtenances, for all weights, forces and applied pressures. In the design of hangers, supports and anchors, unless otherwise shown or specified, pipe pressures shall be the maximum test pressures specified for pipelines carrying gases and twice the maximum test pressures specified for pipelines carrying liquids. The pipe support designer shall have a minimum of 3 years experience in the design of pipe supports and have completed pipe support projects of equal complexity as the systems specified.
 - 1. Pipe support design shall include load and movement calculations.
 - 2. The following loads shall be included in pipe support design and pipe stress analysis:
 - a. Gravity Force, including weight of pipeline and appurtenances, contents, insulation, etc.
 - b. Thermal Expansion Force developed by the restraint of free end displacement of the piping.
 - c. Hydrostatic Forces developed by internal pressure during operation of the piping system.
 - d. Loading due to expansion joint reaction forces.
 - e. Seismic forces, developed in accordance with International Building Code (IBC) 2003, Section 1621 and ASCE 7-02, Section 9.6, in conjunction with the current New York City Construction Codes to the extent that the most stringent provisions are utilized in developing the design seismic forces. Refer to the General Structural Notes on the Structural Drawings of Contract 1 - General Construction for site and structure specific seismic design criteria.

3. Supports, guides and anchors for flexible couplings and expansion joints shall be in accordance with the coupling and joint manufacturer's specification and the standards of the Expansion Joints Manufacturers Association.
 4. Wherever possible, pipe supports shall be designed using manufacturer's standard catalog products.
 5. Hangers and Supports for piping systems subject to thermal expansion and contraction, or to similar movements imposed by other sources, shall be designed to provide flexibility, and pipe stress analysis shall be provided.
 6. Where resonance with imposed vibration and/or shock occurs during operation, suitable dampeners, restraints, anchors, etc., shall be added to remove those effects.
 7. Occasional load calculations and pipe stress analysis shall be provided where required by Construction Codes or Standards. Occasional loads include:
 - a. Seismic forces.
 - b. Pressure waves produced by sudden changes in fluid momentum, commonly referred to as water hammer.
 - c. Wind, snow or ice loads.
 - d. Safety valve thrust loads.
 8. Stressors in hangers, rods and brackets shall be in accordance with Table 2 of MSS-SP-58.
- D. All hangers and supports shall conform to the applicable requirements of ASME B31.1, MSS SP-58, SP-59, SP-69 and SP-90, except as modified herein, and be of standard manufacture wherever possible, and best suited for the service required.
- E. Unless otherwise approved, all hangers, supports and concrete inserts shall be listed with Underwriters' Laboratory, Inc.
- F. General Requirements:
1. Pipe and appurtenances connected to equipment shall be supported in a manner to prevent any stress being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, certification shall be submitted stating that requirements have been complied with.
 2. Where practicable, piping shall be run in groups and parallel to building walls. A minimum clearance of one inch shall be provided between pipe and other work.
 3. Hangers or supports shall be provided at all locations where piping changes direction.
 4. Hangers and supports shall be capable of adjustment after placement of piping.
 5. Types of hangers and supports shall be kept to a minimum.

6. Suspended or supported ductile iron pipe shall have a hanger or support adjacent to each hub or flanged end.
7. Vertical piping shall be supported at each floor and between floors by stays or braces to prevent rattling and vibration.
8. Hanger rods shall be straight and vertical. Chain, wire, strap or perforated bar hangers shall not be used. Hangers shall not be suspended from piping.
9. Contact between dissimilar metals shall be prevented by use of copper plated, rubber or vinyl coated hangers or supports.
10. Hangers and supports shall provide for expansion and contraction throughout the full operating temperature range.
11. Any required pipe supports, for which the supports called for in this Specification are not applicable, shall be fabricated or constructed from standard stainless steel shapes, concrete and anchor hardware, and shall be subject to the approval of Commissioner.
12. Where hanger or support spacing does not correspond with joist or rib spacing, structural steel channels shall be attached to joists or ribs, and the pipes suspended there from.
13. All hanger rods shall be double nutted at each hanger or support.
14. All threaded assemblies shall be double nutted or provided with pinned nuts. Alternately, tack welding of bolted assemblies may be acceptable unless provisions for vertical adjustment are required.
15. At all flexible couplings, supports shall be placed on each side and as close to the coupling as possible. Supports shall be the guide type that prevents axial movement from resulting in pipe deflection and misalignment.
16. Supports, anchorage and guidance for grooved end pipe shall be in accordance with the applicable sections of these specifications and the recommendations of the manufacturer.

1.4 SUBMITTALS

A. Contractor shall submit the following for approval:

1. Name and qualifications of the support and hanger manufacturer.
2. Detailed Working Drawings showing all hangers and supports for each piping system. Working Drawings shall show location, installation, material, loads, forces, stresses and deflections of all hangers and supports. Reaction forces imparted to structures to which hangers and supports are attached shall be shown.

B. Contractor shall submit the following product information for approval:

1. Manufacturer's catalogs and engineered data on all hangers and supports

2. Load ratings
 3. Materials
 4. Installation details
- C. Contractor shall submit all drawings and design calculations signed and sealed by a New York State Licensed Professional Engineer.
- D. Contractor shall provide detailed drawings of each pipe support. Each drawing shall contain enough information to verify the pipe support design and to allow the manufacture of the device. At a minimum, the Contractor shall submit:
1. Scaled details of the device with dimensions
 2. A table of applied forces and moments
 3. A complete bill of materials
 4. An isometric showing the applied forces and moments
 5. Detailed connections to existing structure
 6. Shop and field welds
- E. Each submittal shall be stamped by a New York State Licensed Professional Engineer experienced in pipe support design.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Equipment and materials shall be delivered to the site to insure uninterrupted progress of the Work. Pipe hanger inserts that are to be embedded in cast-in-place concrete shall be delivered in ample time not to delay the Work.
- B. Equipment and materials shall be stored to permit easy access for inspection and identification, and shall be kept in covered storage off the ground, using pallets, platforms or other supports. They shall be protected from condensation, corrosion and deterioration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Pipe hangers, supports and appurtenances shall be standard products of the manufacturers.
- B. Each type of hanger and support shall be the product of a single manufacturer.

2.2 MATERIALS

- A. Materials for hangers and supports of metallic construction shall conform to ASME B31.1 and to the following standards:
1. Structural Steel, ASTM A 36 and A 283
 2. Iron Castings, ASTM A 48 (Class No. 35)

3. Stainless Steel, ASTM A 276:
 - a. Type 316 stainless steel for non-welded items
 - b. Type 316L stainless steel for welded or fabricated items
 - c. Tensile Strength: 70,000 psi minimum
 - d. Yield Strength: 25,000 psi minimum
 - e. Elongation in 2 inches: 35 percent
 - f. Reduction of area: 45 percent
4. Stainless Steel Pipe and Tube, ASTM A 778, Type 316L stainless steel.
- B. Pipe supports, hangers, brackets, guides, restraints, rods, bolts, nuts and anchors shall be Type 316 stainless steel.
- C. Only new materials shall be provided.
- D. Hangers and supports shall conform to MSS-SP-58, Table 2.
- E. Expansion anchors for use in existing concrete structure shall be made of Type 316 stainless steel.

2.3 HANGERS AND SUPPORTS

- A. Hangers and supports where shown shall be in accordance with the Contract Drawings. Hangers and supports not shown shall comply with MSS SP-58.
- B. All hangers and supports shall allow minimum 3-inches of vertical adjustment. Hangers and Supports shall be of the following types:
 1. Hangers for Single Pipes:
 - a. Single pipes shall be supported by hangers suspended by rods from structural steel members, inserts in concrete ceilings and beams, bottom of trapeze hangers and wall mounted steel angle brackets. The strength of the rod shall be based on its root diameter.
 - b. Except for piping subject to thermal expansion and contraction or as otherwise specified, pipe hangers shall be adjustable clevis type MSS SP-58 Type-1.
 - c. Piping subject to thermal expansion and contraction shall be supported on rollers.
 2. Hangers or Supports for Multiple Pipes:
 - a. Multiple pipes, running parallel in the same horizontal plane and adjacent to each other, shall be suspended by trapeze type hangers or supported on wall brackets. Trapeze hangers shall consist of channel sections supported from threaded rods or attached to concrete walls, columns or structural steel support members.

- b. Except as otherwise specified herein, pipe anchors used for attaching pipe to trapeze or multiple pipe wall brackets, shall be anchor or pipe chairs as required.
3. Supports for Single Pipe:
 - a. Single pipes located in a horizontal plane close to the floor shall be supported by one of the methods specified herein or as shown on the Contract Drawings.
 - b. Pipes shall be supported by adjustable stanchions, pipe saddle or roll supports with "U" bolts. Stanchions shall provide at least 4-inches adjustment and be flanged-mounted to floor.
 - c. Where specified or shown, column supports of built-up welded stainless steel shall be provided, as approved by the Commissioner.
 - d. Pipe rollers shall be cast ductile iron unless otherwise shown or specified. Hardware and appurtenances shall be stainless steel.
 4. Wall Supported Pipes: Single or multiple pipes located adjacent to walls, columns or other structural members, and an excessive distance from ceilings or underside of beams, shall be supported using stainless steel wall brackets, MSS SP-58 Type 32 or 33. Where pipes rest on top of bracket pipe supports, attachments shall meet the requirements specified under Paragraph 2.b above.
 5. Supports for Base Elbows: Where pipes change direction from horizontal to vertical through a bend, a welded or cast base anchor support shall be installed at the bend to carry the load.
 6. Supports for Vertical Pipes: Pipe riser clamps shall be used to support all vertical pipes extending through floor slabs. Riser clamps shall be MSS SP-58 Type 42 or 8. Insulation shall be removed from insulated pipes prior to installing riser clamps.

2.4 ACCESSORIES

A. Hanger Rods:

1. Material shall be Type 316 stainless steel for stainless steel hangers and galvanized steel for galvanized steel hangers. Maximum allowable working stress shall be 5,800 psi, calculated based on the root diameter.
2. Rods shall have a square head nut on top and running thread on bottom end. Hanger rods for single pipe hangers shall be sized in accordance with the following schedule:

Hanger Rod Diameter (Minimum)			
Pipe Size (inches)	Single Rod (inches)	Double Rod (inches)	Maximum Load Per Hanger (lbs)
1/2 to 1-1/2, incl	3/8	3/8	300
2	3/8	3/8	325
2-1/2	1/2	3/8	350
3	1/2	3/8	400
3-1/2	1/2	3/8	450
4	5/8	1/2	850
5	5/8	1/2	950
6	3/4	5/8	1075
8	*7/8	5/8	1350
10	*7/8	5/8	1750
12	*7/8	3/4	2200
14	*1	7/8	2500
16	*1	7/8	3075
18	*1	7/8	3700
20	*1-1/4	1	4425
24	*1-1/4	1	6050

* To be used subject to the Commissioner's specific approval

- a. Hanger loads shall be calculated based on the weight of pipe filled with water plus 50 pounds per foot of dead load.

B. Concrete Inserts, Attachment Plates and Clamps:

- Hanger rods up to 7/8-inch diameter shall be attached to new concrete structures using concrete inserts MSS SP-58, Type 18. Inserts shall be malleable iron with galvanized finish. The use of steel inserts is prohibited. Design of the inserts shall permit the rods to be adjusted laterally in one plane and to lock the rod nut or head to the body. The inserts shall be provided with openings or recesses to receive reinforcing rods. To facilitate installation, slots shall be provided in the exposed flanges of the insert. Inserts shall be rated to safely carry the maximum load that can be supported by the hanger rod.
- Hanger rods larger than 7/8-inch diameter shall be attached to new concrete by means of approved hook anchors as shown on the Contract Drawings.

3. Hanger rods shall be attached to existing concrete structures using stainless steel expansion anchors as specified in Division 5 Section "Metal Fabrications."
4. Steel beam clamps shall be malleable iron and conform to MSS SP-58 Type 28 or 29 for wide flange or I-beams, and Type 20 for channel sections or where it is necessary to locate the hanger rod off the beam centerline.
5. Steel U-shape beam attachments welded to the underside of beams, and welded steel brackets fastened to structural steel columns, shall be subject to specific approval of the Structural Steel and Pipe Supports Working Drawings.

2.5 PIPE INSULATION PROTECTION

- A. Contractor shall furnish steel protection saddles on all supports for insulated pipe.
 1. For pipe sizes less than 12 inches in diameter, provide saddles of No. 14 U.S. gauge stainless steel curved 180 degrees for use with roller hangers or structural trapeze hangers and of No. 16 U.S. gauge stainless steel curved 120 degrees for use in clevis hangers. Saddles shall be at least 12-inches long. Saddle gripping side edges shall be turned up at least to the thickness of insulation.
 2. For pipe 12 inches in diameter and larger, provide saddles of No. 12 U.S. gauge stainless steel with a welded centerplate to provide three-edge support. Saddles shall be at least as long as the pipe diameter, provide 120 degree coverage and have edge and centerplate depths equal to the insulation thickness.
- B. Before placing the saddles, saddles shall be filled with either insulating cement or high-density insulation cut to fit. For vapor barrier insulation, the barrier must be maintained; contact between hanger and support and bare pipe will not be permitted.

2.6 PIPE ANCHORS AND BRACES

- A. Anchors and sway braces shall be provided when required to hold the pipelines and equipment in position or alignment. Pipe anchors and braces for rigid fastening to the structures shall be attached to stainless steel anchor plates and anchor bolts set into the forms when placing concrete of new structures. Brackets and braces shall be attached to existing concrete structures with through bolts or expansion anchors.
- B. Anchors, guides and restraints shall be provided for the proper operation of pipeline expansion joints.
- C. Cast iron anchors shall be provided with stainless steel straps on piping, except where anchors form an integral part of pipe fittings and couplings or where an anchor of special design is required or shown on the Contract Drawings.
- D. All pipe anchors, guides and restraints shall be designed to conform to ASME B31.1.

- E. INSPECTION: City of New York may elect to conduct shop inspections. The inspections may include but not be limited to: mechanical and chemical testing, material sampling, material certifications, traceability of parts, blasting and painting, visual and dimensional inspection, and free iron contamination check on stainless steel parts.

PART 3 - EXECUTION

3.1 GENERAL

- A. Hangers, supports, and accessories shall be located within maximum span lengths specified to support continuous pipeline runs unaffected by concentrated loadings.
- B. Hangers or supports shall be provided at all locations where piping changes direction.
- C. Hangers and supports shall be located to prevent vibration or swaying and to provide for expansion and contraction.
- D. Hanger rods shall be straight and vertical. Chain, wire, strap or perforated bar hangers shall not be used. Hangers shall not be suspended from piping.
- E. Concrete embedded items shall be installed before concrete placement.
- F. Embedded items shall be fastened securely to prevent movement during concrete placement.
- G. Hanger and support unit installation methods shall be in accordance with manufacturer's recommendations.

3.2 SPACING OF HANGERS AND SUPPORTS

- A. Supports and Hangers for Horizontal Pipes:
1. Supports and hangers for all piping shall be placed no farther apart than shown below, unless otherwise shown or specified:
 - a. Ductile Iron, Steel and Stainless Steel Pipe:
 - 1) Maximum spacing in accordance with Table 3 of MSS-SP-69. The designer should check the capacity of the steel or building structure to which the hanger or support is attached, and adjust the maximum spacing accordingly.
 - 2) In addition, ductile iron pipe shall have a minimum of two supports per length and shall have a hanger or support adjacent to each end.
 - b. Tubing less than 1-inch diameter: In accordance with best piping practice and ASME B31.1, and as approved by the Commissioner.
 2. Additional supports shall be placed immediately adjacent to any change in piping direction, at equipment, and on both sides of valves, expansion joints and couplings.

B. Supports for Vertical Piping:

1. Riser clamp shall be placed under hub, fitting or coupling with approved solid bearing on steel sleeve.
2. Where riser clamps are used with plastic piping they shall be modified so as not to exert any compressive forces on the pipe.
3. Vertical piping shall be supported at each floor and between floors by stays or braces to prevent rattling and vibration. Maximum spacing shall not exceed 25 feet.
4. Base elbows or welded equivalent shall be provided at vertical piping bases.
5. Top support shall have a horizontal connection, and provide for pipe expansion.

- C. Pipelines installed under plumbing work shall be spaced in conformity with the requirements of the New York City Construction Codes or as specified.

3.3 PAINTING AND COATING

- A. Surfaces of hangers and supports in contact with aluminum, brass, plastic and copper pipelines or pipeline equipment shall be protected with an approved plastic coating to prevent abrasion. Touch-up shall be provided in the field, as required. Coating shall be applied in accordance with the manufacturer's recommendations, and shall be free from spots and brush marks, to the satisfaction of the Commissioner.

3.4 TESTING

- A. All pipe support and restraining systems shall be installed and secured prior to the testing or activation of the pipeline on which they are installed.
- B. After installation, each pipe support system shall be tested in conjunction with the respective piping pressure tests. Tests shall include cycling the piping system to duplicate operating conditions. If any part of the pipe support system proves to be defective or inadequate, as evidenced by vibration or excessive movement, it shall be repaired or augmented at no additional cost to the City of New York.

END OF SECTION 15060

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SECTION 15081 - PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes preformed, rigid and flexible pipe insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.
- B. Related Sections:
 - 1. General Conditions
 - 2. Division 15 Section "Hangers and Supports."

1.2 SUBMITTALS

- A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for the following:
 - 1. Application of protective shields, saddles, and inserts at pipe hangers for each type of insulation and hanger.
 - 2. Insulation application at pipe expansion joints for each type of insulation.
 - 3. Insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 4. Application of field-applied jackets.
- C. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets with requirements indicated. Include dates of tests.
- D. Installer Certificates: Signed by the Contractor certifying that installers comply with requirements.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.5 COORDINATION

- A. Coordinate clearance requirements with piping Installer for insulation application.

1.6 SCHEDULING

- A. Schedule insulation application after testing piping systems. Insulation application may begin on segments of piping that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.

1. Cellular-Glass Insulation:

- a. Pittsburgh-Corning Corp.
- b. Armstrong World Industries Inc.
- c. Certainteed Corp.
- d. Manville Products Corp.

2.2 INSULATION MATERIALS

- A. Cellular-Glass Insulation: Inorganic, foamed or cellulated glass, annealed, rigid, hermetically sealed cells, incombustible.

1. Preformed Pipe Insulation, without Jacket: Comply with ASTM C 552, Type II, Class 1.
2. Preformed Pipe Insulation, with Jacket: Comply with ASTM C 552, Type II, Class 2.

- B. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in performing insulation to cover valves, elbows, tees, and flanges.

2.3 METAL JACKETS

- A. Stainless Steel Jackets: ASTM A 167 or ASTM A 240/A 240M; Type 304, minimum thickness of 33 gage (0.010 inch), smooth surface with factory-applied polyethylene and

kraft paper moisture barrier on inside surface. Provide stainless steel bands, minimum width of 0.5 inch.

B. Factory-Fabricated Fitting Covers:

1. Same material, finish, and thickness as jacket.
2. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
3. Tee covers.
4. Flange and union covers.
5. End caps.
6. Beveled collars.
7. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.4 ACCESSORIES AND ATTACHMENTS

- A. Stainless Steel Bands: 3/4 inch wide x 0.007 inch thick, materials compatible with jacket.
- B. Coating and vapor barrier treatment shall be less than 0.02 perms, and shall be Benjamin Foster 30-35, MEI 55-10, Childers CP-30 (indoors), Childers Encacel 5 (outdoor)
- C. Vapor barrier sealant and flashing compound shall be equal to Benjamin Foster No. 30-45, MEI 44-05, Childers CP-70 or CP-76.

2.5 VAPOR RETARDERS

- A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.

- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.
- E. Apply 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. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- H. Keep insulation materials dry during application and finishing.
- I. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- J. Apply insulation with the least number of joints practical.
- K. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.
- L. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.
 - 1. Apply insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches from point of attachment to pipe and taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
 - 3. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.
- M. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- N. Apply adhesives and mastics at the manufacturer's recommended coverage rate.
- O. Apply insulation with integral jackets as follows:
 - 1. Pull jacket tight and smooth.

2. Circumferential Joints: Cover with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches o.c.
 3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches. Apply 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 4 inches o.c.
 - a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.
 4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
 5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.
- P. Exterior Wall Penetrations: For penetrations of exterior walls, terminate insulation flush with mechanical sleeve seal. Seal terminations with vapor-retarder mastic.
- 3.4 CELLULAR-GLASS INSULATION APPLICATION
- A. Apply insulation to straight pipes and tubes as follows:
1. Secure each layer of insulation to pipe with wire, tape, or bands without deforming insulation materials.
 2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic.
 3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches o.c.
 4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.
- B. Apply insulation to flanges as follows:
1. Apply preformed pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the 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 the same thickness as pipe insulation.
 4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch, and seal joints with vapor-retarder mastic.

C. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded sections of insulation are not available, apply mitered sections of cellular-glass insulation. Secure insulation materials with wire, tape, or bands.
3. Cover fittings with metal jacking.
4. Cover fittings metal jacking. Overlap metal jacking on pipe insulation jackets at least 1 inch at each end. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.

D. Apply insulation to specialties as follows:

1. Apply insulation to flanges as specified for flange insulation application.
2. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
3. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.

3.5 PIPING SYSTEM APPLICATIONS

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.
- B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
 1. Vibration-control devices.

3.6 FIELD QUALITY CONTROL

- A. Inspection: Perform the following field quality-control inspections, after installing insulation materials, jackets, and finishes, to determine compliance with requirements:
 1. Inspect fittings and valves randomly selected by Commissioner.
 2. Remove fitting covers from 20 elbows or 1 percent of elbows, whichever is less, for various pipe sizes.
 3. Remove fitting covers from 20 valves or 1 percent of valves, whichever is less, for various pipe sizes.
- B. Insulation applications will be considered defective if sample inspection reveals noncompliance with requirements. Remove defective Work and replace with new materials according to these Specifications.

- C. Reinstall insulation and covers on fittings and valves uncovered for inspection according to these Specifications.

3.7 INSULATION APPLICATION SCHEDULE, GENERAL

- A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.
- B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements.

3.8 INSULATION APPLICATION SCHEDULE

- A. Indoor Service Storm Drainage Piping
 - 1. Insulation Material: Cellular glass.
 - 2. Vapor Retarder: Yes.
 - 3. Jacket: Stainless Steel.
 - 4. Insulation Thickness: Insulation shall be 1-inch thick

END OF SECTION 15081

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SECTION 15120 – INTERIOR AND EXPOSED PIPING SCHEDULES

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish and install all interior and exposed piping as indicated in the interior and exposed piping schedules, and as specified in Division 15.
- B. Related Sections:
 - 1. Division 2 Section "Installation of Buried Pipelines".
 - 2. Division 15 Section "Piping Insulation."
 - 3. Division 15 Section "Storm Drainage Piping".

1.2 SCHEDULES

- A. All piping shall be provided as listed in the Interior and Exposed Piping Schedule at the end of this section.
- B. Nomenclature for nominal pipe size ranges shall be as follows: "to" means all pipe sizes within the listed range including the upper listed size, and "up to" means all pipe sizes within the listed range not including upper listed size.
- C. Exposed or interior piping includes all piping that is not buried below ground, encased in concrete, or below the lowest finished floor elevation in structures.
- D. All vent lines for the Rainwater Storage Tanks.
- E. All rubber gaskets used in piping joints shall be suitable for the application.
- F. Abbreviations used in the pipe schedules are:
 - 1. Pipe Material:
 - a. 304LSS - 304L Stainless Steel
 - b. 316LSS - 316L Stainless Steel (Low carbon)
 - c. CISP - Cast Iron Soil Pipe
 - d. CS - Carbon Steel
 - e. CU - Copper
 - f. DI - Ductile Iron
 - g. FRP - Fiberglass Reinforced Plastic
 - h. ST - Steel
 - i. RCP - Reinforced Concrete Pipe

2. Protective Coatings:

a. Interior:

- 1) BC - Bituminous Coating (Cold)
- 2) CL - Cement Lined
- 3) GALV - Galvanized
- 4) KL - KYNAR Lined

b. Exterior:

- 1) AC - Asphalt Coated
- 2) BH - Bituminous Coating (Hot)
- 3) GALV - Galvanized
- 4) PR - Shop Primed (and field painted per Section 09900 – Painting)

3. Type of Joint:

- a. BS - Bell and Spigot
- b. CLAM - Clam Shell
- c. FLG - Flanged
- d. GR - Grooved
- e. RPOJ - Restrained Push on Joints
- f. SD - Soldered
- g. SC - Screwed
- h. THD - Threaded
- i. WLD - Welded
- j. NH - No Hub (Hubless)

4. Pipe Class or Thickness:

- a. CL - Class
- b. SCH - Schedule
- c. EXWT - Extra Heavy Weight
- d. WT - Service Weight

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

INTERIOR AND EXPOSED PIPING SCHEDULE

Service	Size (inches)	Pipe Material	Protective Coatings		Joints	Test Pressure (psig)	Pipe Class or Thickness	Insulation Thickness (inches)	Jacket Material	Remarks
			Interior	Exterior						
Drain, Vent and Storm Underground	2 and Larger	CISP	BC	PR	BS	5	EXWT	--	--	Spec Section 15160
Drain, Vent and Storm Aboveground	2 and Larger	CISP	BC	PR	BS	5	WT	Spec Section 15081	Spec Section 15081	Spec Section 15160

General Notes:

1. Wall thickness shall be as specified.
2. Storm sewer in the yard within 5 feet of building shall be per specification section 02.503 "Installation of Buried Pipe Lines".

END OF SECTION 15120

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SECTION 15160 – STORM DRAINAGE PIPING AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Section includes furnishing and installing storm drain pipe, fittings, accessories, specialties as shown, specified or required for a complete installation and satisfactory operation. Provide pipe and fittings of new materials, protected from dirt, moisture and mechanical damage. This specification section applies to all interior plumbing work and up to the building foundation wall and vents for the underground tank.
- B. Related Sections:
 - 1. General Conditions
 - 2. Division 2 Section "Installation of Buried Pipe lines".
 - 3. Division 2 Section "Leakage Tests."
 - 4. Division 15 Section "Basic Mechanical Materials and Methods."
 - 5. Division 15 Section "Hangers and Supports."
 - 6. Division 15 Section "Plumbing Specialties."
 - 7. Division 15 Section "Interior and Exposed Piping Schedule".

1.2 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with the following minimum working-pressure ratings, unless otherwise indicated:
 - 1. Storm gravity piping: 10-foot head of water.

1.4 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.
- B. Flexible Transition Couplings for Underground Non-Pressure Piping: ASTM C 1173 with elastomeric sleeve. Include ends of same sizes as piping to be joined and include corrosion-

resistant metal band on each end.

2.2 CAST-IRON SOIL PIPING

A. Hub-and-Spigot Pipe and Fittings: ASTM A 74, Service and Extra-Heavy weight.

1. Gaskets: ASTM C 564, rubber.

2.3 STEEL PIPING

A. Steel Pipe: ASTM A 53, Type Grade A or B, Schedule 40, galvanized. Include ends matching joining method.

1. Steel Pipe Nipples: ASTM A 733 made of ASTM A 53 or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.

2. 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.

3. Cast-Iron, Threaded, Drainage Fittings: ASME B16.12, galvanized.

4. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.

5. Cast-Iron Flanges: ASME B16.1, Class 125.

6. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125, galvanized.

7. Steel-Piping, Expansion Joints: Compound, galvanized steel fitting with telescoping body and slip-pipe section. Include packing rings, packing, limit rods, chrome-plated finish on slip-pipe section, and flanged ends.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.

B. Aboveground Storm Drainage Piping and vents: Use the following piping materials for each size range:

1. NPS 2 to NPS 15: Service weight, cast-iron soil piping; gaskets; and gasketed joints.

C. Underground Storm Drainage Piping and vents: Use the following piping materials for each size range:

1. NPS 2 to NPS 15: Extra-Heavy weight, cast-iron soil piping; gaskets; and gasketed joints.

3.2 PIPING INSTALLATION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation.
- B. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers.
- C. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping.
- D. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for sleeves and mechanical sleeve seals.
- E. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for wall penetration systems.
- F. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- G. Make changes in direction for storm piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- H. Lay buried building drain piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- I. Install storm drainage piping at the following minimum slopes, unless otherwise indicated:
 - 1. Building Storm Drain: 1 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
 - 2. Horizontal Storm-Drainage Piping: 1 percent downward in direction of flow.
- J. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- K. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.3 JOINT CONSTRUCTION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping

joint construction.

- 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.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Refer to Division 15 Section "Hangers and Supports" for pipe hanger and support devices. 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 and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer than 100 Feet, if indicated: MSS Type 49, spring cushion rolls.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet 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 15 Section "Hangers and Supports."

- C. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

- D. 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: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6: 60 inches with 3/4-inch rod.
5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.
6. NPS 15: 60 inches with 1-inch rod.
7. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

- E. Install supports for vertical cast-iron soil piping every 15 feet.

- F. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 84 inches with 3/8-inch rod.
 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
 3. NPS 2: 10 feet with 3/8-inch rod.
 4. NPS 2-1/2: 11 feet with 1/2-inch rod.
 5. NPS 3: 12 feet with 1/2-inch rod.
 6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
 7. NPS 6: 12 feet with 3/4-inch rod.
 8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.
- G. Install supports for vertical steel piping every 15 feet.
- H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

3.6 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in. Perform inspection before burying of piping.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find 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 authorities having jurisdiction.
- D. Test storm drainage piping according to procedures of authorities having jurisdiction and Division 2 Section "Leakage Tests."
- E. Clean interior of piping. Remove dirt and debris as work progresses.
- F. Protect drains during remainder of construction period to avoid clogging with dirt and

debris and to prevent damage from traffic and construction work.

- G. Place plugs in ends of uncompleted piping at end of day and when work stops

END OF SECTION 15160

SECTION 15430 - PLUMBING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. General: This specification section applies to all interior plumbing work.
- B. This Section includes the following plumbing specialties:
 - 1. Miscellaneous piping specialties
 - 2. Sleeve penetration systems
 - 3. Flashing materials
 - 4. Cleanouts
 - 5. Roof drains
- C. Related Sections:
 - 1. General Conditions
 - 2. Division 7 Section "Sheet Metal Flashing and Trim."
 - 3. Division 15 Section "Basic Mechanical Materials and Methods."

1.2 SUBMITTALS

- A. Product Data: Include rated capacities and shipping, installed, and operating weights. Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following:
 - 1. Cleanouts and roof drains
 - 2. Vent caps, vent terminals, and roof flashing assemblies
 - 3. Sleeve penetration systems
- B. Field test reports.

1.3 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of plumbing specialties and are based on the specific system indicated.
- B. Plumbing specialties shall bear label, stamp, or other markings of specified testing agency.
- C. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for piping materials and installation.

PART 2 - PRODUCTS

2.1 MISCELLANEOUS PIPING SPECIALTIES

- A. Roof Flashing Assemblies: Manufactured assembly made of 6-lb/sq. ft., 0.0938-inch- thick, lead flashing collar and skirt extending at least 8 inches from pipe with galvanized steel boot reinforcement, and counterflashing fitting.
 - 1. Open-Top Vent Cap: Without cap
 - 2. Low-Silhouette Vent Cap: With vandal-proof vent cap
 - 3. Extended Vent Cap: With field-installed, vandal-proof vent cap
- B. Stack Flashing Fittings: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
- C. Vent Caps: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and set-screws to secure to vent pipe.
- D. Vent Terminals: Commercially manufactured, shop- or field-fabricated, frost-proof assembly constructed of galvanized steel, copper, or lead-coated copper. Size to provide 1-inch enclosed air space between outside of pipe and inside of flashing collar extension, with counterflashing.

2.2 SLEEVE PENETRATION SYSTEMS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. ProSet Systems, Inc.
- B. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.
 - 1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.

2.3 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-lb/sq. ft., 0.0625-inch thickness
 - 2. Vent Pipe Flashing: 3-lb/sq. ft., 0.0469-inch thickness
 - 3. Burning: 6-lb/sq. ft., 0.0938-inch thickness
- B. Copper Sheet: ASTM B 152, of the following minimum weights and thicknesses, unless otherwise indicated:
 - 1. General Applications: 12 oz./sq. ft..
 - 2. Vent Pipe Flashing: 8 oz./sq. ft..

- C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch minimum thickness, unless otherwise indicated. Include G90 hot-dip galvanized, mill-phosphatized finish for painting if indicated.
- D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.
- E. Fasteners: Metal compatible with material and substrate being fastened.
- F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- G. Solder: ASTM B 32, lead-free alloy.
- H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

2.4 CLEANOUTS

- A. Comply with ASME A112.36.2M ASME A112.3.1.
- B. Cleanouts shall conform to the features of the cleanouts contained in the schedule below. The manufacturer's numbers are for the purpose of type only. The Contractor shall submit manufacturer product technical data for each type required before installation for approval.
 - 1. Gasket seal plugs will not be accepted in place of taper thread plugs.
- C. Cleanout plugs shall be bronze and countersunk type with taper screw threads.
- D. Cleanouts for cast iron pipe and galvanized steel pipe in exposed horizontal runs and accessible hung ceilings shall be as follows:
- E. Cleanouts for membrane waterproof floors shall be furnished with an integrally cast flashing flange with flashing clamp. Cleanouts in unfinished areas shall have cast iron tops and covers and in finished areas shall have nickel bronze tops and covers.

Cleanout Schedule:

<u>Location</u>	<u>Piping</u>	<u>Figure Number</u>
Wall	Exposed Cast Iron	Smith 4420 Wade W-8550-D MIFAB C1450 Or approved equal
Wall	Concealed Cast Iron	Smith 4532-U Wade W-8460-R MIFAB C1460RD-6 Or approved equal

2.5 ROOF DRAINS

- A. Roof Drain (RD-1): Provide coated cast-iron type drain, with large cast-iron locking dome strainer, non-puncturing flashing clamp ring with integral gravel stop, large sump with roof flange and bottom caulked outlet. Provide 4 inch high perforated stainless steel gravel guard.
1. Provide J.R. Smith Mfg. Co. No. 1015-R-C.
 2. J.R.Smith
 3. Zurn
- B. Overflow Roof Drain (ORD-1): Provide coated cast-iron type drain with flashing clamp and gravel stop, with cast iron dome and cast iron water dam.
1. Provide J.R. Smith Mfg. Co., No. 1080-CL-R-C.
 2. J.R.Smith
 3. Zurn

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" 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. Use NPS 4 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 for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- C. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.
- D. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.
- E. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.
- F. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.

1. Install roof-drain flashing collar or flange so no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
 2. Position roof drains for easy access and maintenance.
- G. Fasten wall-hanging plumbing specialties securely to supports attached to building substrate if supports are specified and to building wall construction if no support is indicated.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Connect plumbing specialties to piping specified in other Division 15 Sections.
- D. Ground equipment.

3.3 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-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4-lb/sq. ft., 0.0625-inch thickness or thinner.
 2. Copper Sheets: Solder joints of copper sheets.
- 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, and skirt or flange extending at least 8 inches around pipe.
 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches 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.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Division 7 Section "Sheet Metal Flashing and Trim."
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.
- G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 15430

SECTION 15810 - DUCTWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Ductwork materials, construction, hangers and supports, and cleaning.
- B. Related Sections :
 - 1. General Conditions

1.2 REFERENCES

- A. Codes and standards referred to in this Section include:

- 1. ASHRAE - ASHRAE Handbook - Fundamentals; Duct Design.
- 2. ASHRAE - ASHRAE Handbook - HVAC Systems and Equipment; Duct Construction.
- 3. ASTM A 36/A36M - Specification for Structural Work.
- 4. ASTM A 90/A90M - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- 5. ASTM A 240 - Heat-Resisting chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
- 6. ASTM B 209 - Aluminum and Aluminum Alloy Sheet and Plate.
- 7. ASTM A 480 - General Requirements for Flat Rolled Stainless Heat-Resisting Steel Plate and Strip.
- 8. ASTM A 653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated by the Hot-Dip Process.
- 9. ASTM A 700 - Practices for Packaging, Marking and Loading Methods for Steel Products for Domestic Shipment.
- 10. ASTM C 411 - Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
- 11. ASTM C 916 - Specification for Adhesives for Duct Thermal Insulation.
- 12. ASTM C 920 - Specification for Elastomeric Joint Sealants.
- 13. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.
- 14. AWS D1.1 - Structural Welding Code - Steel.

- 15. AWS D9.1 - Sheet Metal Welding Code.
- 16. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- 17. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
- 18. New York City Building Code 2008, Section 1621 and ASCE 7-02, Section 9.6
- 19. SMACNA - HVAC Duct Construction Standards.
- 20. SMACNA - Round Industrial Duct Construction Standards.
- 21. SMACNA - Fire Damper Guide.
- 22. UL 181 - Factory Made Air Ducts and Air Connectors.

1.3 DEFINITIONS

- A. Sealing Requirements Definitions: The following definitions apply for duct system sealing requirements:
 - 1. Seams: Joining of two longitudinally (in the direction of airflow) oriented edges of duct surface material occurring between two joints. All other duct surface connections made on the duct perimeter are deemed to be joints.
 - 2. Joints: Joints include girth joints; branch and subbranch intersections; so-called duct collar tap-ins; fitting subsections; louver and air terminal connections to ducts; access door and access panel frames and jambs; duct, plenum, and casing abutments to building structures.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements: The duct system design, as indicated, has been used to select and size air moving and distribution equipment and other components of the air system. Changes or alterations to the layout or configuration of the duct system must be specifically approved in writing. Accompany requests for layout modifications with calculations showing that the proposed layout will provide the original design results without increasing the system total pressure.

1.5 SUBMITTALS

- A. Shop Drawings: Submit shop drawings indicating duct systems routing, sizes, fitting details, reinforcing, support, required clearances, and installed accessories and devices.

1.6 QUALITY ASSURANCE

- A. General: Provide materials from a company specializing in the design and manufacture of ductwork and duct fittings having a minimum of 3 years documented experience, which issues complete catalog data on these products.

- B. Codes: Qualify welding processes and welding operators in accordance with AWS D1.1 for hangers and supports and AWS D9.1 Certify that each welder qualification is current.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver sealant and fire-stopping materials to site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Storage and Protection: Store and handle sealant fire-stopping materials in compliance with manufacturers' recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes. Store ductwork and duct fittings in a clean dry place and protect from physical damage.

PART 2 - PRODUCTS

2.1 DUCTWORK

- A. General: Provide ductwork and plenums conforming to the more stringent recommendations of the current editions of the ASHRAE Handbook and of the SMACNA "HVAC Duct Construction Standards", "Round Industrial Duct Construction Standards" and "Accepted Industry Practice for Industrial Duct Construction".
- B. Corrosion-Resistant Ductwork: Provide the type of corrosion-resistant ductwork in accordance with the following designations:
 - 1. Type A: ASTM A 240, Type 316L stainless steel.
- C. Construction Material: Provide hangers and supports, reinforcing and duct specialties fabricated of Type 316L stainless steel. Where dissimilar metals join, isolate metals electrolytically to prevent corrosion.
- D. Reinforcing: Reinforce ductwork to prevent sagging, flexing and drumming, and build ductwork to be airtight at the fan static pressures scheduled.
- E. Dimensions: The dimensions of the ducts shown are not to be considered absolute; however, any changes from dimensions indicated are subject to approval. Where it is necessary to change dimensions of ducts, do not exceed equivalent friction loss.
 - 1. Duct sizes noted are the clear dimensions inside the duct liner for lined ducts, or the actual inside dimensions for unlined ducts.
- F. Hangers and Supports: Provide duct hangers and supports meeting the following requirements:
 - 1. Building Attachments: Fasten duct hangers and supports to concrete surfaces with Type 316 stainless steel threaded expansion type concrete anchors when cast-in-place concrete inserts are not installed. Do not cut reinforcing steel. Do not use powder actuated concrete fasteners.

2. Hangers: Securely support horizontal ducts from the building structure by means of hanger rods or angle supports as recommended in the current editions of the ASHRAE Handbook and of the SMACNA "HVAC Duct Construction Standards", "Round Industrial Duct Construction Standards" and "Accepted Industry Practice for Industrial Duct Construction. Provide the hanger rods sized for the weight carried, threaded at both ends, and equipped with nuts and washers. Provide angles as duct bottom supports. When angle hangers are used, extend the hangers from flanged duct connections, extended stiffeners, or fabricated trapezes.
 3. Duct Attachments: Provide sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
 4. Riser Supports: Provide steel shape conforming to ASTM A 36/A36M as follows:
 - a. Where Type 316L stainless steel ducts are installed, provide Type 316L shapes and plates.
- G. Pressure Loss: Provide duct curves, bends, offsets, transitions and transformation pieces to be gradual, to minimize air turbulence. In general, design duct transformations changing air velocity for minimum loss in total pressure.
1. Refer to equipment schedules for duct system pressure and seal classifications.
- H. Seismic Requirements: All ductwork shall be provided with seismic restraints in accordance with the seismic Restraint Manual, guidelines for Mechanical Systems, latest edition, as published by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) and designed in accordance with the seismic provisions of the New York Building Code 2008, Section 1621 and ASCE7-02, Section 9.6. Refer to the General Structural Notes on the Structural Drawings for site and structure specific seismic design criteria.

2.2 TYPE A CORROSION-RESISTANT DUCTWORK (STAINLESS STEEL)

- A. All stainless steel ductwork shall be shop fabricated in sections with welded flanged ends. No field welding of ductwork shall be permitted. Welding equipment and electrodes shall be of a type specifically suited for welding light gauge Type 316 stainless steel to provide consistently good quality welds. Stainless steel duct sheet thicknesses shall be two gauge heavier than the thickness specified in SMACNA standards for galvanized steel duct.
- B. Flanged duct joint shall be 0.25-in Butyl gasketed and bolted together with stainless steel (Type 316) bolts, nuts, washer and lock washers. All duct joints shall be airtight.
- C. All accessories shall be fabricated of the same stainless steel material as the associated ductwork. Supports, angles, clamps and hardware shall be Type 316 stainless steel.
- D. Performance: Duct system performance shall meet requirements at the system design static pressure as indicated on the drawings.

2.3 IDENTIFICATION

- A. General: Provide the manufacturer's standard laminated plastic, color coded duct markers.
- B. Nomenclature: Include the following:
 - 1. Direction of air flow
 - 2. Duct service (supply, return, exhaust, etc.)
 - 3. Design CFM

PART 3 - EXECUTION

3.1 APPLICATION

- A. General: Except as otherwise indicated construct all ductwork as specified of Type A Stainless steel in accordance with SMACNA standards.
- B. Corrosion-Resistant Ductwork: The following systems require Type A corrosion-resistant ductwork.
 - 1. All ductwork.

3.2 DUCT INSTALLATION, GENERAL

- A. Duct System Pressure Class: Construct and install each duct system for the specific duct pressure classification as required.
- B. Joints: Install ducts with the fewest possible joints.
- C. Fittings: Use fabricated fittings for all changes in directions, changes in size and shape, and connections.
- D. Duct Openings: Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- E. Layout: Coordinate layout with lighting layouts and similar finished Work.
- F. Temporary Closures: During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- G. Hanging and Supporting: Support ductwork as follows:
 - 1. Make provisions for supporting all ductwork, dampers and other ductwork accessories, where necessary.
 - 2. Construct, reinforce, support and brace ductwork to prevent buckling, warping, sagging, flexing and vibrating and be quiet in operation under all operating conditions and airtight at the fan static pressures scheduled.

3. Support vertical ducts as recommended in the current editions of the ASHRAE Handbook and of the SMACNA "HVAC Duct Construction Standards", "Round Industrial Duct Construction Standards" and "Accepted Industry Practice for Industrial Duct Construction".

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Furnish the services of a qualified representative of the manufacturer to provide inspect the completed installation and make any necessary adjustments.

3.4 CLEANING

- A. Keep each duct system internally clean by installing only clean materials and by providing temporary closures during the installation.
- B. Remove all loose materials and obstructions from interior of ducts.
- C. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

END OF SECTION 15810

SECTION 15820 – DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Ductwork accessories such as turning vanes, volume dampers, duct hardware, instrument test holes, gravity backdraft dampers, and outside air intakes.
- B. Related Sections:
 - 1. General Conditions
 - 2. Division 15 Section "Testing, Adjusting and Balancing"

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. SMACNA - HVAC Duct Construction Standards, Metal and Flexible.
 - 2. ASHRAE - Handbook - Systems and Equipment; Recommendations pertaining to construction of ductwork accessories.
 - 3. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

1.3 SUBMITTALS

- A. Product Data: Submit catalog product data indicating dimensions, assembly, materials and finishes, and operation and performance data.
- B. Shop Drawings: Submit shop drawings for shop fabricated assemblies. Provide product data for the hardware used.
- C. Operation and Maintenance Data: Submit the manufacturer's installation, maintenance, and repair data as specified in General Conditions including a parts list for each type of duct accessory. Include this data, product data, and shop drawings in the operation and maintenance manual.

1.4 QUALITY ASSURANCE

- A. Provide equipment from manufacturers regularly engaged in the design and manufacture of ductwork accessories, of the types and sizes required, which have a minimum of 3 years documented experience and which issue complete catalog data on these products.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store products in a clean, dry place and protect from physical damage in their original shipping packings, with labeling in place until the time of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
- B. Turning Vanes:
 - 1. Aero Dyne Co.
 - 2. Tuttle and Bailey.
- C. Volume Dampers:
 - 1. Ruskin Mfg. Co.
 - 2. Vent Product Co.
- D. Duct Hardware:
 - 1. Ventfabrics Inc.
 - 2. Young Regulator Co.
- E. Instrument Test Holes:
 - 1. Ventfabrics Inc.
 - 2. Young Regulator Co.
- F. Gravity Backdraft Dampers
 - 1. Air Balance Inc.
 - 2. American Warming and Ventilating Inc.
 - 3. Ruskin Mfg. Co.
 - 4. Swartwout Model 426 - FRP Dampers.
- G. Outside Air Intakes – Louver Face
 - 1. Greenheck Fan Corp.
 - 2. Loren Cook Co.

2.2 MATERIALS

- A. General: Fabricate ductwork accessories of Type 316L stainless steel. Construct duct accessories in accordance with SMACNA "HVAC Duct Construction Standards."
- B. Turning Vanes: Provide turning vanes as follows:

1. Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed of the same material as the associated ductwork in accordance with SMACNA "HVAC Duct Construction Standards".
- C. Volume Dampers:
1. Reference: SMACNA Standards
 2. Material: As specified for ductwork
 3. Blades: Opposed blades, vinyl edge seals
 4. Provide outside handle, quadrant and approved position indicator and locking device.
 5. Performance:
 - a. Damper Leakage: Not more than 16 cfm per square foot at 4-inch W.G.
 - b. Certification: Manufacturer shall provide certified test data.
- D. Duct Hardware: Provide duct hardware, manufactured by one manufacturer for all items on project, for the following:
1. Quadrant Locks: Provide for each damper, a quadrant lock device on one end of the shaft; and an end bearing plate on the other end for damper lengths over 12 inches. Provide extended quadrant locks and end extended bearing plates for externally insulated ductwork.
 2. Damper Remote Drives: Provide remote flexible drive where specified, complete with flexible couplings, linkages and concealed type regulators for flush ceiling mounting.
- E. Test Holes: Provide instrument test holes in the ducts and plenums at appropriate locations for insertion of 3/4-inch pitot tubes and similar air measuring instruments. Equip the openings with removable, tight fitting caps or covers.
- F. Gravity Backdraft Dampers:
1. Provide counterbalanced interlinked backdraft dampers. Construct the dampers complete with jamb and blade seals, nonmetallic bearings, and adjustable counterbalance on extended shaft. Provide dampers suitable for operation at a maximum of 4 inches w.g. and a pressure drop not exceeding 0.2 inches w.g.
 2. Provide counterbalanced interlinked backdraft dampers as shown and as specified. Construct the dampers of 0.90-inch thick extruded aluminum with extruded aluminum 0.025-inch blades, complete with extruded vinyl blade seals, nonmetallic bearings, 1/8-inch by 1/2-inch aluminum tie bars and adjustable zinc plated counterbalance bars on each blade. Provide dampers suitable for operation at -40 to 200 degrees F and a pressure drop not exceeding 0.02 inches w.g.
- G. Outside Air Intakes:
1. Louver Face: Provide louvered epoxy coated in and out outside air intake.

2. Construction: Provide louver face gravity ventilators where shown and specified meeting the following requirements.
 - a. Provide factory assembled, low silhouette louver house, meeting the size, minimum capacity and arrangement as shown and specified.
 - b. Fabricate units of heavy gauge 6063T5 extruded aluminum storm style blades with the corners mitered and welded.
 - c. Fabricate roof and curb caps of heavy gauge aluminum and the entire assembly rigidly braced, with curb caps of size coordinated with the curb. (Insulate roof with 2-inch high density fiberglass board insulation.)
 - d. Provide aluminum insect screens.
 - e. Provide units with a velocity not exceeding 300fpm through net louver area, and a pressure drop across the units not exceeding 0.1w.g.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install ductwork accessories in accordance with the manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function. Make all necessary adjustments to provide a complete and satisfactory operation upon completion of the installation.
- B. Turning Vanes: Install turning vanes in square or rectangular 90 degree elbows in supply, return and exhaust air systems, and elsewhere as indicated.
- C. Volume Dampers: Install volume dampers in the main air intake duct.
- D. Duct Hardware: Install locking quadrant controls for each volume damper.
- E. Instrument Test Holes: Provide instrument test holes in ducts where required for testing and balancing purposes.
- F. Gravity Backdraft Dampers: Install backdraft dampers at gravity relief locations and where shown.
- G. Coordination: Coordinate as necessary to interface installation of ductwork accessories properly.

3.3 FIELD QUALITY CONTROL

- A. Tests: Operate installed ductwork accessories to demonstrate their compliance with the specified requirements. Test for air leakage while the system is operating. Repair or replace faulty accessories, as required to obtain proper operation and leak proof performance.
- B. Manufacturer's Field Services: Provide the services of a qualified representative of the manufacturer to inspect the installation of equipment, certify that it meets the manufacturer's recommendations, and instruct the operating personnel in its operation and maintenance.

3.4 ADJUSTING AND CLEANING

- A. Adjusting: Adjust ductwork accessories for proper settings.
 - 1. Final positioning of manual dampers shall be in accordance with the requirements of Division 15 Section "Testing, Adjusting and Balancing."
- B. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with the manufacturer's touch-up paint.

END OF SECTION 15820

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SECTION 15830 - FANS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: The following types of fans and control accessories:

1. Roof-mounted fans.
2. Control dampers.
3. Damper Operators.
4. Thermostats.

B. Related Sections:

1. General Conditions
2. Division 16 Section "Electric Motors."
3. Division 16 Section "Control Components and Devices."

1.2 REFERENCES

A. Codes and standards referred to in this Section include:

1. AMCA 99 - Standards Handbook.
2. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
3. AMCA 300 - Reverberant Room Method for Sound Testing of Fans.
4. AMCA 301 - Method of Calculating Fan Sound Ratings from Laboratory Test Data.
5. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
6. AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
7. ASTM A 27/A27M - Specification for Steel Castings, Carbon, for General Application.
8. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.
9. NEC - National Electrical Code.
10. NEMA - National Electrical Manufacturers Association.
11. SMACA - HVAC Duct Construction Standards.
12. SSPC-SP1 - Solvent Cleaning.

- 13. SSPC-SP2 - Hand Tool Cleaning.
- 14. SSPC-SP3 - Power Tool Cleaning.

1.3 SUBMITTALS

A. Product Data: Submit complete catalog product data, including the following:

- 1. Dimensions.
- 2. Assembly.
- 3. Weights.
- 4. Specialties and accessories.
- 5. Rated capacities.
- 6. Performance ratings.
- 7. Controls.
- 8. Certified fan performance curves with system operating conditions indicated, including brake horsepower, static pressure, and static efficiency plotted against air volume for the duty scheduled.
- 9. Certified fan sound power ratings, for both fan outlet and casing radiation at rated capacity.
- 10. Motor ratings and electrical characteristics plus motor and fan accessories.
- 11. Wiring diagrams that detail power, signal, and control wiring. Differentiate between manufacturer-installed wiring and field-installed wiring.
- 12. Materials gauges and finishes, including color charts.
- 13. Dampers, including housings, linkages, and operators.

B. Shop Drawings: Submit shop drawings detailing equipment assemblies and indicating locations, dimensions, weights, required clearances, construction details, and location and size of field connections.

C. Noise Level Testing: Submit manufacturer's equipment operating performance documentation and proposed noise control measures.

D. Operation and Maintenance Manuals: Submit manufacturers descriptive literature, as specified in General Conditions including operation instructions, lubrication instructions, motor and drive replacement instructions, wiring diagrams, controls, accessories maintenance and repair data, and parts listing. Include this data and product data in the operation and maintenance manual.

1.4 QUALITY ASSURANCE

- A. Performance Ratings: Conform to AMCA 210 and place the AMCA Certified Rating Seal on the equipment.
- B. Sound Ratings: Conform to AMCA 301, test to AMCA 300 and place the AMCA Certified Sound Rating Seal on the equipment.
- C. Fabrication: Conform to AMCA 99.
- D. Fans and Components: Provide UL listed and labeled fans and components.
- E. Motors and Electrical Accessories: Comply with NEMA standards and NEC.
- F. Manufacturer: Provide equipment from a company regularly engaged in design and manufacture of fans, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years documented experience, and which issues complete catalog data on these products.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to site in factory fabricated protective containers. Handle products properly to prevent damage, breaking, denting and scoring. Do not install damaged equipment. Replace damaged units with new. Comply with manufacturer's instructions for unloading and transporting equipment to final location.
- B. Storage and Protection: Store equipment in its original containers with labeling in place until the time of installation.

1.6 SEQUENCE AND SCHEDULING

- A. Equipment Roof Supports: Coordinate the installation of roof curbs, equipment supports, and roof penetrations.
- B. Structural Supports: Coordinate the size and location of structural steel support members.

1.7 SPARE PARTS

- A. Furnish spare parts wrapped or boxed, indexed and tagged with complete information for use and reordering. Provide the following spare parts.
 - 1. One complete set of belts for each belt-driven fan.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
- B. Roof-Mounted Louver Face Fans:
 - 1. Greenheck Fan Corp.

2. Penn Ventilator Co.
 3. Loren Cook Co.
- C. Roof Curbs:
1. Thybar Corp.
 2. Pate.
 3. Greenheck Fan Corp.
- D. Aluminum Control Damper
1. Ruskin - Model CD50
 2. Air Balance - Series 500
 3. Greenheck Fan Corp.
- E. Damper Operators
1. Hytork Controls Inc. (Model EXCEL).
 2. Johnson Controls
 3. Belimo Air Controls
- F. Thermostats
1. Indeeco - Cat. No. C211-040
 2. Honeywell
 3. Kele

2.2 FANS, GENERAL

- A. General Design: Factory fabricate, assemble, test, and finish fans of the arrangement, minimum size, capacities and characteristics scheduled.
- B. Fan Performance: Provide fans tested and rated in accordance with Air Movement and Control Association, Inc. (AMCA) test procedures, bearing the AMCA rating seal. Provide certified performance curve for each fan.
- C. Fans and Shafts: Provide fans statically and dynamically balanced at the factory. Design fans for continuous operation at the maximum rated fan speed and motor horsepower. Provide turned, ground, and polished steel fan shafts designed to operate at no more than 70 percent of the first critical speed at the top of the speed range of the fan's class.
- D. Belt Drives: Provide drives of a V-belt type, factory mounted, with final alignment and belt adjustment made after installation. Provide V-belt drives which have a minimum service factor of 1.5 based on motor horsepower.
- E. Belts: Provide V-belt type belts in matched sets. Provide oil-resistant, non-sparking, and non-static belts.
- F. Motor and Fan Wheel Pulleys: Use adjustable pitch motor sheaves with motors through 15 hp. Select pulley so that pitch adjustment is at the middle of the adjustment range at fan

design conditions. Include an allowance to replace motor and fan wheel pulleys as required to obtain required airflow during final air balance of system.

- G. Belt Guards: Provide steel belt guards for motors mounted on the outside of the fan housing.
- H. Shaft Bearings: Provide self-aligning grease lubricated bearings of the type indicated having a median life "Rating Life" AFBMA L50 of 200,000 hrs., calculated in accordance with ANSI/AFBMA Standard 9 for ball bearings and ANSI/AFBMA Standard 11 for roller bearings.
- I. Lubrication: Provide fan lubrication fittings extended to the service side with aluminum tubes and secured accessibly outside the fan housing.
- J. Motors: Provide TEFC high energy efficient type motors in accordance with the requirements of Division 16 Section "Electric Motors.". Provide motors, electrical equipment and wiring meeting NEC electrical classification requirements shown and as specified.
- K. Electrical Equipment: Provide all electrical equipment and materials, including combination motor starters, circuit breakers and disconnect circuit breakers in accordance with the requirements of Division 16.
- L. Seismic Requirements: All fans shall be provided with seismic restraints in accordance with the seismic Restraint Manual, guidelines for Mechanical Systems, latest edition, as published by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) and designed in accordance with the seismic provisions of the International Building Code (IBC) 2003, Section 1621 and ASCE 7-02, Section 9.6, in conjunction with the current New York City Construction Codes to the extent that the most stringent provisions are utilized in developing the design seismic forces. Refer to the General Structural Notes on the Structural Drawings for site and structure specific seismic design criteria.

2.3 ROOF-MOUNTED FANS

- A. General: Provide all aluminum construction roof-mounted louver face fans of a centrifuge type with housing, weatherproof hood and curb cap; incorporate following specified features.
- B. Entire Assembly: Bear AMCA Certified Rating Seal.
- C. Louvered Penthouse Hood: Provide heavy gauge extruded aluminum housing braced where necessary to prevent vibration. Provide lifting lugs. Provide hinged aluminum cover for quick access to motor and drive assembly.
- D. Drive: Provide V-belt drives, sized for minimum of 150 percent of driven horsepower.
- E. Wheel: Provide backward curved aluminum blade wheel, non-overloading design.
- F. Motors: Provide motors equipped with permanently factory lubricated bearings guaranteed for normal operation without further lubrication.

- G. Openings: Provide openings equipped with bird screens for exhaust fans.
- H. Fan Bearings: High quality ball or roller type mounted in cast iron pillow blocks with grease fittings. Provide pulleys of the fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.
- I. Vibration: Provide the entire fan and motor assembly mounted on vibration isolators.
- J. Disconnect Switch: Provide NEMA4X integral disconnect switch for each fan.
- K. Prefabricated Curbs: Provide fans complete with roof curbs as specified.
- L. Protective Coatings: Finish all metal surfaces in and out with epoxy coatings.

2.4 ROOF CURBS

- A. Provide prefabricated roof curbs of types as required and shown. Provide curbs of monolithic construction, 14 gauge epoxy coated galvanized steel, with continuous arc-welded corner seams, epoxy coated galvanized steel inner liner, factory-installed wood nailer and insulated with 1 1/2-inch thick, 3-pound density rigid fiberglass board insulation. Provide curbs with a minimum height of 12 inches above the finished roof deck and of the style and design to mate the deck. Provide all curbs with tops leveled, with pitch built into curb where roof slopes 1/4 inch per foot or more.

2.5 CONTROL DAMPERS

- A. General: Provide multiple blade control dampers of the sizes shown at locations shown and specified. Furnish control dampers of the low leakage type designed to give not more than 15 cfm leakage per square foot of a 48-inch square damper at 4-inch w.g. pressure differential when tested in accordance with AMCA 500.
- B. Aluminum Dampers: Provide aluminum dampers constructed of 6063 T5 extruded aluminum. Construct frames of 5-inch wide, 1/8-inch thick extruded aluminum with mounting flanges, reinforced corners and flexible aluminum jamb seals. Supply blades of double wall airfoil type extruded aluminum with extruded replaceable blade seals locked in extruded blade slots. Furnish axles and linkage in the air stream of 316 stainless steel.

2.6 DAMPER OPERATORS

- A. Corrosion-Resistant Operators: Provide corrosion-resistant damper operators which match or exceed corrosion resistance of the dampers or associated ductwork to which the operators are installed. Provide damper operators which have a cast-aluminum body complete with travel stops for rotational adjustment. Provide a finish of Di-aluminum Tri-oxide (Al_2O_3), a hard corrosion-resistant ceramic-like coating, for all damper operators. Provide damper operators protected against corrosion and furnished with the following:
 - 1. Epoxy coating - 1 coat primer and 2 finish coats.

2. Electrical feed through connectors sealed gastight with silicone rubber after wiring is completed.
3. Cover mounted 24-volt ac transformers (as an extension of the damper motor housing) or transformer mounted in a NEMA 4X enclosure.
4. Gastight gasketing.

2.7 THERMOSTATS

- A. Electric Thermostats: Provide electric thermostats as two-position type of fully modulating type as required. Furnish electric thermostats with bimetallic sensing elements and concealed adjustable set point. Supply electric thermostats with field adjustable sensitivity and with thermometers in covers of approved standard finish. Equip electric modulating type thermostats to operate on the balanced bridge principle. Provide all thermostats to be electric, corrosion-resistant type in a NEMA 4X enclosure with a nickel-plated or stainless steel bulb.

2.8 SOURCE QUALITY CONTROL

- A. Perform the following factory tests:
 1. Sound Power Level Ratings: Comply with AMCA Standard 301 "Method for Calculating Fan Sound Ratings from Laboratory Test Data." Test fans in accordance with AMCA Standard 300 "Test Code for Sound Rating." Provide fans which are licensed to bear the AMCA Certified Sound Ratings Seal.
 2. Units Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings in accordance with AMCA Standard 210/ ASHRAE Standard 51 - Laboratory Methods of Testing Fans for Rating.

2.9 IDENTIFICATION

- A. General: Provide the manufacturer's standard laminated plastic, color coded equipment markers.
- B. Nomenclature: Include the following, matching terminology on schedules as closely as possible:
 1. Name and drawing number
 2. Equipment service
 3. Design capacity
 4. Other design parameters such as pressure drop, entering and leaving conditions, rpm, etc.
- C. Size: Provide approximate 2-1/2-inch x 4-inch markers for control devices, dampers, and 4-1/2-inch x 6-inch for equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine equipment and field conditions as follows.
 - 1. Examine fans at the time of delivery for damaged or missing components.
 - 2. Examine areas and conditions for compliance with requirements for installation tolerances, and other conditions affecting performance of fans.
 - 3. Do not proceed until unsatisfactory conditions have been corrected.
- B. Power Supply: Verify that the proper power supply is available.

3.2 INSTALLATION

- A. General: Install equipment in accordance with the manufacturer's recommendations and approved shop drawings. Make all necessary adjustments to equipment to provide complete and satisfactory operation upon completion of the installation.
- B. Support fans as described below.
 - 1. Install prefabricated roof mounting curbs for roof-mounted fans, watertight in accordance with the prefabricated curb manufacturer's recommendations. Secure roof-mounted fans to roof curbs. Set each fan on a continuous 2- by 1/2-inch sponge neoprene gasket. Flange connecting ducts over the wood mounting frame attached to the fan curb. Provide roof openings in accordance with approved manufacturers shop drawing submittals.
- C. Vibration Correction: If undesirable vibration occurs in the fan after installation, rebalance the fan in the field or replace to achieve operation within acceptable limits.
- D. Access Space: Provide access space around fans and motors for service. Provide no less than minimum as recommended by the manufacturer. Allow space for motor removal.
- E. Electrical Leads: Install fans, as shown and specified, with flexible electrical leads.
- F. Safety Screen: Provide safety screen where fan inlet or outlet is exposed.
- G. Backdraft Dampers: Provide backdraft dampers on discharge of exhaust fans and as indicated.
- H. Operating Requirements: Do not operate fans for any purpose until ductwork is clean, bearings are lubricated, and fans have been test run under observation.
- I. Lubrication: Properly lubricate all pieces of equipment, furnished with lubrication fittings, prior to start-up and at recommended intervals before turning equipment over to the City of New York. Attach a linen tag or heavy-duty shipping tag to each piece of equipment showing the date of lubrication and the name and number of lubricant used. Furnish typewritten list, in triplicate, of each item lubricated and the type of lubricant used.

- J. Noise Control: Comply with NYC Local Law 113 regulations for exterior noise propagation and to confirm that outdoor sound level meets the requirements. Perform testing/reporting to establish ambient baseline noise level conditions prior to installation of new equipment. Perform testing/reporting of operating noise level (ambient directional) of new equipment after completion of installation.

3.3 FIELD QUALITY CONTROL

- A. Adjustment and Cleaning: Perform adjusting and cleaning as follows:

1. Align, adjust and balance each belt drive to prevent noise and vibration.
2. Adjust damper linkages for proper damper operation.
3. Start fan system and check for excessive leaks and vibration and correct.
4. Remove all loose materials and obstructions from interior of equipment.
5. Remove debris and waste materials resulting from installation.
6. Clean tar, adhesive, dirt or marks from exterior of unit.

- B. Manufacturer's Field Services: Furnish the services of a qualified representative of the manufacturer to inspect the installation of equipment, and certify that it meets the manufacturer's recommendations. Make any necessary adjustments, test and place the equipment in satisfactory operating condition and instruct the operating personnel in its operation and maintenance.

END OF SECTION 15830

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SECTION 15950 – TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for providing and installing the following:

1. Testing, adjustment and balancing of air systems.
2. Measurement of final operating conditions of HVAC systems.

B. Related Sections :

1. General Conditions
2. Division 15 Section "Fans."

1.2 REFERENCES

A. Codes and standards referred to in this Section include:

1. AABC - National Standards for Field Measurement and Instrumentation, Total System Balance.
2. ASHRAE - Most Recent Applications Handbook: Chapter 57, Testing, Adjusting and Balancing.
3. NEBB - Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

1.3 SUBMITTALS

- A. Testing and Balancing Agency: Submit the name and qualifications of the testing, adjusting and balancing agency and their personnel for approval within 30 days after the award of the contract.
- B. Test Reports: Submit a complete set of all approved tests prior to final acceptance.
- C. System Testing and Balancing: Submit a detailed account of the proposed methods and sequence to carry out system testing and balancing.
- D. Draft Reports: Prior to commencing the Work, submit draft reports indicating adjusting, balancing and equipment data required. Submit three draft copies of the report for review prior to final acceptance. Provide three final copies for the City and for inclusion in the operation and maintenance manuals.
- E. Reports Quality: Provide reports in soft cover, letter size, 3 ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include a set of reduced drawings with air outlets and inlets, and equipment identified to correspond with the data sheets, and indicating thermostat locations.

- F. Testing and Balancing Equipment: Submit data sheets of specific instruments to be used, listing their most recent calibration dates prior to commencing system balance.
- G. Other Requirements: Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guarantee, prior to commencing the system balance.

1.4 REPORT FORMS

A. General: Submit reports on AABC National Standards for Total System Balance or NEBB forms.

B. Format: Include the following information on the report forms:

1. Title Page:

- a. Company name.
- b. Company address.
- c. Company telephone number.
- d. Project name.
- e. Project location.
- f. Project COMMISSIONER.
- g. Project CONTRACTOR.
- h. Project altitude.

2. Instrument List:

- a. Instrument.
- b. Manufacturer.
- c. Model.
- d. Serial number.
- e. Range.
- f. Calibration date.

3. Exhaust Fan Data:

- a. Identification/Location.
- b. Manufacturer.
- c. Model/Size.
- d. Air flow, design and actual.
- e. Total static pressure (total external), design and actual.
- f. Inlet pressure.
- g. Discharge pressure.
- h. Fan RPM.

4. Electric Motors:

- a. Manufacturer.
- b. HP/BHP.
- c. Phase, voltage, amperage; nameplate, actual, no load.
- d. RPM.
- e. Enclosure.

- f. Service factor.
 - g. Starter size, rating, heater elements.
5. V-Belt Drive:
- a. Identification/Location.
 - b. Required driven RPM.
 - c. Driven sheave, diameter and RPM.
 - d. Belt, size and quantity.
 - e. Motor sheave, diameter and RPM.
 - f. Center to center distance, maximum, minimum and actual.
6. Duct Traverse:
- a. System zone/branch.
 - b. Duct size.
 - c. Area.
 - d. Design velocity.
 - e. Design air flow.
 - f. Actual velocity.
 - g. Actual air flow.
 - h. Duct static pressure.
 - i. Air temperature.
 - j. Air correction factor.
7. Air Distribution Test Sheet:
- a. Air terminal number.
 - b. Room number/location.
 - c. Terminal type.
 - d. Terminal size.
 - e. Area factor.
 - f. Design velocity.
 - g. Design air flow.
 - h. Actual velocity.
 - i. Actual air flow.
 - j. Percent of design air flow.
8. Vibration Test:
- a. Location of points- for selected (app. 20%) of fans and pumps and those equipments that exhibit vibration, questionable noise generation or both.
 - 1) Fan bearing, drive end.
 - 2) Fan bearing, opposite end.
 - 3) Motor bearing, center (if applicable).
 - 4) Motor bearing, drive end.
 - 5) Motor bearing, opposite end.
 - 6) Casing (bottom or top).
 - 7) Casing (side).

- 8) Duct after flexible connection (discharge).
 - 9) Duct after flexible connection (suction).
- b. Test readings:
 - 1) Horizontal, velocity and displacement.
 - 2) Vertical, velocity and displacement.
 - 3) Axial, velocity and displacement.
 - c. Normally acceptable readings, velocity and acceleration.
 - d. Unusual conditions at time of test.
 - e. Vibration source (if noncomplying).

9. Duct Leak Test:

- a. Description of ductwork under test.
- b. Duct design operating pressure.
- c. Duct design test static pressure.
- d. Duct capacity, air flow.
- e. Maximum allowable leakage duct capacity times leak factor.
- f. Test apparatus:
 - 1) Blower.
 - 2) Orifice, tube size.
 - 3) Orifice size.
 - 4) Calibrated.
- g. Actual static pressure.
- h. Actual orifice differential pressure.
- i. Leakage.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit record documents as specified in General Conditions.
- B. Location Record: Accurately record actual locations of flow measuring stations balancing valves and rough setting.

1.6 QUALITY ASSURANCE

- A. Provide services from a company specializing in the testing, adjusting and balancing of systems specified in this Section with minimum 3 years documented experience certified by AABC or NEBB.
 - 1. Perform Work under supervision of AABC Certified Test and Balance Commissioner or NEBB Certified Testing, Balancing and Adjusting Supervisor.
 - 2. Perform the total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental System.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence the Work to commence after completion of systems and schedule completion of Work before Substantial Completion. Schedule and provide assistance in final adjustment and test of life safety, smoke evacuation and smoke control system with the Fire Authority.

1.8 PRE-INSTALLATION

- A. Conference: Convene a conference 1 week prior to commencing testing.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before commencing Work, verify that the systems are complete and operable. Verify the following:
 - 1. Equipment is operable and in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Duct systems are clean of debris.
 - 5. Fan rotations are correct.
 - 6. Volume dampers are in place and open.
 - 7. Air outlets are installed and connected.
 - 8. Duct system leakage has been minimized.
- B. Defects and Deficiencies: Report any defects or deficiencies noted.
- C. System Imbalance: Promptly report abnormal conditions in mechanical systems or conditions which prevent system balancing.
- D. Acceptance of Existing Conditions: Beginning of testing means acceptance of existing conditions.

3.2 PREPARATION

- A. Additional Balancing: Provide additional balancing devices as required.
- B. Instruments: Provide instruments required for testing adjusting and balancing operations. Make these instruments available to facilitate spot checks during testing.

3.3 INSTALLATION TOLERANCES

- A. Air Systems: Adjust the air systems to plus or minus 5 percent from the design figures indicated.

3.4 ADJUSTING

- A. Completion: Properly install, inspect and confirm proper operation of each individual component of the system before giving notice to proceed with testing, adjusting and balancing. Do not perform testing, adjusting and balancing until all mechanical equipment is properly installed and is 100 percent operational, all temperature controls are installed and calibrated and all systems are cleaned.
- B. Deficiency and Correction: Assist in the system testing, adjusting and balancing. Adjust the system and make corrections of any deficiencies found such as: motor starters and horsepower; improper sheave and belt sizes; missing, improperly installed or malfunctioning volume control dampers, air extractors, power wiring, controls and any other items that prevent the completion of the system testing, adjusting and balancing.
- C. Recorded Data: Record data representing actually measured or observed conditions.
- D. Settings: Permanently mark settings of dampers and other adjustment devices then allow the balanced settings to be restored.
- E. Balance Verification: After adjustment, take measurements to verify that the balance has not been disrupted or that such disruption has been rectified.
- F. Operating Systems: Leave systems in proper working order, replacing belt guards, closing doors to electrical switch boxes, and restoring thermostats to the specified settings.

3.5 AIR SYSTEM TESTING AND BALANCING

- A. Perform air system balancing as follows:
 - 1. Check volume dampers for correct position, and temperature controls for completeness of installation.
 - 2. Prepare test report sheets for fans, and air inlets and outlets. Obtain the manufacturer's flow factors and follow the recommended procedure of testing.
 - 3. Open all supply dampers, and place all fans in specified operation.
 - 4. Check motor amperage and voltage for each motor, fan rotation, and automatic dampers for proper position.
 - 5. Check temperature controls and verify that they are operating to deliver design temperatures.
 - 6. Using Pitot tube and calibrated manometer traverse the duct and ascertain the total air being delivered. Adjust or replace pulleys and belts and install additional dampers if required to obtain the design airflow.
 - 7. Make additional test and adjustment passes through entire systems as necessary to obtain the noted outlet values.

8. Read and record amperage readings for each motor lead, fan static and velocity pressures and the static pressure drop across each major component (i.e., intake).
 9. Adjust air terminal outlets for proper distribution pattern.
 10. Inspect and test all electrical protective devices and circuits for proper motor protection, including properly sized starter overload heater elements, for all equipment furnished.
 11. Provide a system schematic with the required and actual air quantities recorded at each outlet or inlet.
- B. Permanently mark the balance position of all manual volume dampers.

3.6 OPERATION DEMONSTRATION

- A. When each system has been completed and proved functional, demonstrate its intended operation in each of its operating modes. Simulate in an acceptable manner functions dependent upon parameters such as weather, process or emergency conditions which are unavailable at the time of test, or separately demonstrate when those parameters exist, to assure proper functioning under all operating conditions. Immediately after testing, properly reset control settings temporarily modified for such simulations.
- B. Final acceptance of the Work will be contingent upon the operation of all equipment and systems meeting the specified requirements.

END OF SECTION 15950

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SECTION 16020 - TEMPORARY ELECTRICAL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing a complete temporary electrical system to supply power and light as required for the construction related activities as specified and shown. Provide a temporary electrical system that is complete and includes but is not limited to: service entrance and distribution center, conduit, wire, grounding, lighting fixtures, panel boards and all auxiliary equipment necessary to support the construction.
- B. Related Sections:
 - 1. DDC General Conditions
 - 2. Division 16 Section "Basic Electrical Materials and Methods."
 - 3. Division 16 Section "Grounding."
 - 4. Division 16 Section "Wires and Cables - 600 Volts and Below."
 - 5. Division 16 Section "Electrical Raceway Systems."

1.2 REFERENCES

- A. Codes and Standards: The following codes and standards are referred to in this Section:
 - 1. NEC - National Electrical Code
 - 2. NYCCC - New York City Construction Codes
 - 3. NESC - National Electrical Safety Code
 - 4. Local Utility Requirements
 - 5. OSHA - Occupational Safety and Health Administration Regulations

1.3 SYSTEM DESCRIPTION

- A. The Contractor shall make all necessary arrangements with the Utility and shall provide a temporary electrical service point connection. Connecting lines and service supply shall be of sufficient capacity to supply all temporary light and power required on the site.
- B. Arrangements shall be made with the Utility immediately after notice to commence work.
- C. The service shall have provisions for meter connections for each Contractor on the work site and the Commissioner. The service shall be branched and metered using circuit breakers or fused switches and meters.
 - 1. The distribution from each meter to the Contractor's field office and shops at the site shall be the responsibility of each Contractor.
 - 2. The distribution from one (1) meter to Commissioner's field office shall be the responsibility of the Electrical Contractor.
 - 3. The distribution from one (1) meter to the construction temporary light, power, and security system shall be the responsibility of the Electrical Contractor.

- D. Each Contractor shall be responsible for making arrangements with the Utility to have a sealed meter installed and for payment of it.
- E. The energy charges for each Contractor's field office and shop usage shall be the responsibility of each Contractor.
- F. Energy charges associated with the work areas general power and lighting and the security site lighting shall be the responsibility of the Electrical Contractor. Energy charges associated with the Commissioner's field office shall be the responsibility of the Electrical Contractor.
- G. Each Contractor requiring additional temporary power and light, beyond that provided under by the Electrical Contractor as specified herein, shall arrange with the utility for such additional temporary power and light and shall bear the costs of all material and ancillary equipment necessary.

1.4 DESIGN REQUIREMENTS

- A. The Electrical Contractor shall provide all systems and circuits in accordance with the Electrical Code of the City of New York, NFPA 70, the National Electrical Safety Code, Utility codes, and OSHA requirements.
- B. The temporary electrical system shall be provided in accordance with the following design requirements:
 - 1. Each Contractor and the Commissioner's trailer complex shall have a separate branch.
 - 2. A separate branch shall supply the work area general lighting, power, and security. Receptacles (GFI type) shall be located throughout the work area. Receptacle connected equipment shall be suitable for 120 volt operation. Operating input shall not exceed 1500 volt-amperes. Illumination levels shall be as required by OSHA.
 - 3. Security site lighting circuits shall supply a system of security lighting for the work area, field office complex(s), Contractors' staging areas, and all parking areas. Unless specifically shown otherwise on the Contract Drawings or stated in the Detailed Specifications, the system shall be arranged to provide a minimum lighting intensity of 5-foot candles in these areas.
 - 4. The installed capacity shall meet all specified requirements.
 - 5. See attached Sketch MAN 1,2,5-1.06B.5 for Temporary Electrical System Arrangement Schematic Diagram.

1.5 SUBMITTALS

- A. General: Furnish all submittals in accordance with the General Conditions, including the following.
- B. Product Data and Information: Furnish manufacturer's catalog data for the main service equipment used in the Temporary Electrical System.

C. Shop Drawings: Furnish shop drawings showing the following:

1. One line diagram representing the power distribution for the temporary system.

1.6 QUALITY ASSURANCE

- A. The temporary general lighting system shall provide lighting for access to and egress from the work and for safe and expeditious construction within designated enclosed areas of the structure or structures.
- B. All temporary electrical system equipment and components shall be of recent manufacture and of proper working order for the intended purpose.
- C. The temporary electrical system shall be designed to meet all applicable codes and standards, and shall operate within proper voltage limits under anticipated usage.
- D. The Electrical Contractor shall maintain in proper working order and repair the temporary electrical system.
- E. The Electrical Contractor shall modify, extend, and relocate the temporary electrical system components, as needed, to support construction activities.
- F. The Electrical Contractor shall remove the temporary electrical system when directed by the Commissioner. Where additional facilities were required by other Contractors (as specified in 1.3G hereinbefore), removal thereof shall be at their own expense.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in the General Conditions.

PART 2 - PRODUCTS

2.1 ELECTRICAL SERVICE CONNECTION

- A. The Electrical Contractor shall provide a service entrance and distribution center at the service point. Service entrance and distribution equipment shall be in accordance with the following:
 1. Enclosures shall be rated NEMA 3R.
 2. Service entrance equipment shall be suitable for the available fault current from ConEdison at the point of delivery – Contractor shall obtain fault current data from Utility.
 3. Meter pans shall be suitable for revenue meters furnished by the utility.
 4. Circuit breakers shall be thermal magnetic type. Circuit breakers shall be equipped with lockable handles.

5. Disconnect switches shall be fused type with current limiting fuses. Disconnect switches shall be equipped with padlocking features.
 6. All equipment and connections shall be approved by the Utility.
- B. The Electrical Contractor shall also provide the following other equipment at the service point:
1. Eight-foot high, steel chain link fence with gate shall enclose the service entrance and distribution center. The fence shall be arranged so to permit a minimum clearance distance of 6 feet between the fence and the equipment.
 2. The fence shall include baked enamel, 14 by 10 inch caution signs. The signs shall read, "DANGER - HIGH VOLTAGE - KEEP - OUT". The signs shall be bolted to the fence on each side of the fence and on the main gate.
 3. A 4/0 AWG ground grid consisting of four ground rods, one at each corner, shall be provided. Maximum ground resistance shall be 2 ohms. Grounding system shall be in accordance Division 16 Section "Grounding."

2.2 RACEWAYS AND WIRING

- A. All conductors shall be 600 volt, enclosed in properly sized raceways or be routed aerially using Type AC, MC or TC cable.
- B. Conductors shall be provided for all devices, suitably sized for the intended purpose. Conductors installed in raceways shall be single conductor type THWN or equal to be approved by the Commissioner and the utility. Armored cable, Type AC, metal-clad cable, Type MC or power and control tray cable, Type TC shall also be permitted. Exposed OH cables shall be RHW or USE insulated.
- C. Raceways where used shall be suitably sized for the conductors. Raceways shall be rigid metallic type.
- D. Aerially routed cables shall be messenger supported from solid wood poles or other recognized means. Messenger shall be high strength galvanized steel.
- E. Poles shall have a class suitable for the installation in accordance with the National Electrical Safety Code and the utility and shall be thirty feet length minimum. Poles shall be guyed at angle or corner runs and when eccentrically loaded.

2.3 LIGHTING FIXTURES AND DEVICES

- A. Receptacles (GFI type) shall be grounded type, 120 volt, 20 ampere suitable for hand tools such as drills, hammers and grinders.
- B. General lighting lamps shall be 100 watt installed in suitable lamp holders. Security lighting lamps shall be 400-watt high pressure sodium installed within a floodlight type fixture suitable to illuminate the intended area.

- C. Switches, breakers and miscellaneous equipment shall be suitable for the intended purpose, with voltage, current and short circuit interrupting ratings as required for the circuits.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Temporary wiring systems shall be installed without interfering with the work of other Contractors.
- B. The ground grid cable shall be installed in loop fashion completely around and outside the service point fence. The fence and distribution equipment shall be connected to the grid at a minimum of two locations.
- C. The temporary general lighting system shall be installed progressively in structures as the designated areas are enclosed or as lighting becomes necessary because of partial enclosure. Lamps shall be installed to provide an even distribution of illumination over the work areas.
- D. Receptacles shall be installed in such a manner so as to reach any point in the work areas with an extension cord not to exceed 40 feet in length.
- E. Security lighting shall be installed on poles to illuminate the staging and parking areas.
- F. Aerial conductors shall be installed at a minimum height of 14 feet above finished grade. When conductors cannot be routed at the proper height or where it will interfere with plant operations or construction activities, conductors shall be provided in rigid steel conduit and installed underground.

3.2 OPERATION

- A. The Electrical Contractor shall keep the temporary power and lighting system alive in accordance with the General Conditions of the Construction Contract.

3.3 MAINTENANCE

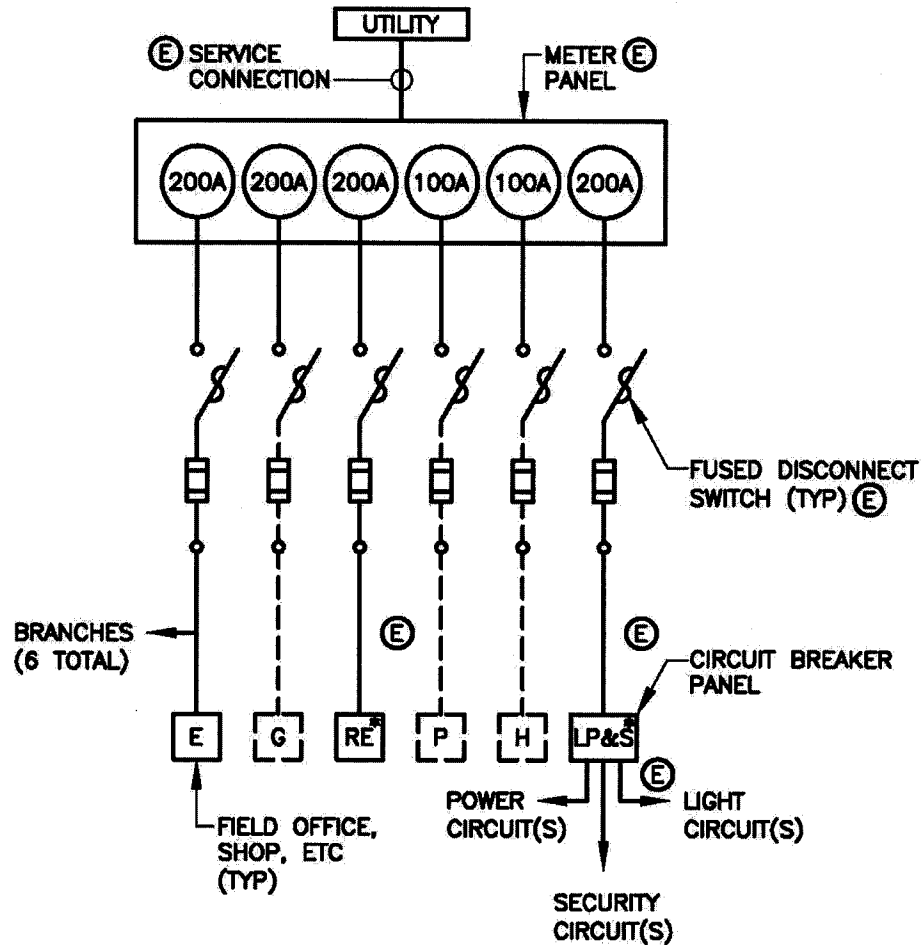
- A. The temporary electrical system shall be maintained and repaired until it is no longer required.
- B. Lamps, fuses and other equipment shall be repaired and/or replaced, as required.

3.4 REMOVAL

- A. At the conclusion of the work, when directed by the Commissioner, the temporary system shall be removed in its entirety. The ground surfaces and structures disturbed by the work shall be restored to their original condition.

(See Sketch MAN-1.06B.5 on next page.)

TEMPORARY POWER DISTRIBUTION SYSTEM ARRANGEMENT



- BY ELECTRICAL
- BY OTHERS
- E - ELECTRICAL
- G - GENERAL
- RE - RESIDENT ENGINEER
- P - PLUMBING
- H - HEATING, VENTILATING, & AIR CONDITIONING
- * - SUPPLY WITH MAIN BREAKER

SKETCH MAN125-1.06B.5

-END OF SECTION-

16020

SECTION 16050 – BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: General requirements for providing basic electrical materials and methods.
- B. Related Work Specified in Other Sections Includes:
 - 1. Certain equipment, control devices, conduit and wiring are shown on electrical drawings, but are specified in other sections pertaining to plumbing, heating, ventilating, air conditioning, temperature control systems, process equipment, process control systems and instrumentation. Install and connect these items to the electrical system as indicated or required in accordance with the Contract Documents.
- C. Overall Application of Specifications: This Section applies to all Division 16 sections and to other sections that include requirements for electrical equipment. Irrespective of where the electrical requirements are specified, provide (furnish and install) all materials necessary for a complete operational system.
- D. Temporary Requirements: This Section applies to any temporary circuits, overcurrent devices, conduit, wiring, and other equipment required during changeover from the existing electrical system to a new electrical system. This Section also applies to temporary rewiring of lighting circuits, power circuits, instruments and devices.

1.2 DEFINITIONS

- A. Corrosive Areas: The following areas are designated corrosive areas:
 - 1. Outdoor Areas
 - 2. Driveways
- B. Severe Corrosive Areas: The following areas are designated severe corrosive areas:
 - 1. Interior Areas of Salt Shed
 - 2. Building Floor Slabs
- C. Architectural Finished Areas: The following areas are designated as architectural finished areas:
 - 1. Outside Walks
 - 2. Outside walls

1.3 SUBMITTALS

- A. General: Furnish all submittals, including the following, as specified in the General Conditions.

- B. Product Data and Information: Furnish a complete list of electrical equipment and materials to be furnished that shows the manufacturer, catalog number, size, type, capacity, voltage rating and other pertinent information related to each item on the list.
1. Furnish catalog data on the manufacturer's standard equipment and materials. Clearly indicate on the catalog data the equipment and devices specifically being proposed.
 2. Identification: Furnish a complete schedule or listing of system and equipment identification labels with legends.
- C. Contractor's Shop Drawings: Furnish shop drawings on items manufactured for the Contract.
1. Furnish a connection diagram and schematic for each piece of electrical equipment. A manufacturer's standard connection diagram or schematic showing more than one method of wiring is not acceptable unless, the intended method is clearly marked.
 2. Furnish diagram that show connections to field equipment. Clearly differentiate between manufacturer's wiring and field wiring.
- D. Coordination Drawings: Furnish coordination drawings that have a scale of 1/4"=1'-0" or larger; that show major elements, components, and systems of electrical equipment as they relate to other systems, installations, and building components. Indicate locations where access space is limited and where sequencing and coordination of installations are required for the efficient flow of the Work, including (but not limited to) the following:
1. Indicate the proposed locations of major raceway systems, equipment, and materials. Include the following:
 - a. Clearances for servicing equipment, including space for equipment disassembly as required for periodic maintenance
 - b. Exterior wall and foundation penetrations
 - c. Fire-rated wall and floor penetrations
 - d. Equipment connections and support details
 - e. Sizes and location of required concrete pads and bases
 - f. Hazardous Areas.
- E. Record Documents: Furnish record documents, and in addition to the requirements specified in the General Conditions, indicate installed conditions for:
1. Interior and exterior major raceway systems' sizes and locations; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker sizes and arrangements

2. Exposed and concealed equipment locations dimensioned from prominent building lines
 3. Approved substitutions, and actual equipment and materials installed
- F. Maintenance Manuals: Furnish maintenance manuals, and in addition to the requirements specified in the General Conditions, include the following information for equipment items:
1. Functional description, normal operating characteristics and limitations, performance curves, Engineering data and tests, and complete nomenclature and catalog numbers of replacement parts
 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions
 3. Maintenance procedures for routine preventative maintenance and trouble-shooting; disassembly, repair, and reassembly; aligning and adjusting instructions
 4. Servicing instructions and lubrication charts and schedules

1.4 QUALITY ASSURANCE

- A. Codes: Provide all electrical Work in accordance with applicable local codes, regulations and ordinances. If there is a conflict between the requirements specified in the Contract Documents and the codes, follow the more stringent requirements as determined and approved.
- B. Testing: As a minimum, provide standard factory and field tests for each type of equipment. Other tests may be specified in the applicable equipment section.
- C. Labeling: Provide electrical equipment and materials that are listed and approved by Underwriters Laboratories or other OSHA recognized testing laboratories with the testing agency's label attached.
- D. Standard Products: Unless otherwise indicated, provide electrical materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturer's latest standard design that conforms to these Specifications. Provide the products of the same manufacturer when two or more units of the same class of material and equipment are required.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in the General Conditions and as follows:
- B. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.

- C. Acceptance at Site: Conform to acceptance requirements as described in the General Conditions.
- D. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.
- E. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

1.6 PROJECT CONDITIONS

- A. General: The Drawings indicate the extent and general arrangement of the principal electrical elements, outlets, devices and circuit layouts. Install and connect all electrical elements and devices to form a complete workable system as required by the Contract Documents, regardless of whether all system components are specifically stated in the Specifications or shown. Provide necessary materials and installation wherever required to conform to the specific requirements of the furnished equipment and for proper installation of the Work.
- B. Schematics: In general the runs of feeders are shown schematically and are not intended to show exact routing and locations of raceways. Verify actual and final arrangement, equipment locations, and prepare circuit and raceway layouts before ordering materials and equipment. Equipment locations are approximate and are subject to modifications as determined by approved equipment dimensions.
- C. Coordination of Work: Coordinate the Work so that the electrical equipment may be installed without altering building components, other equipment or installations.
- D. Departure from Design: If departures are deemed necessary due to structural conditions, obstructions or other problems, provide details of such departures and the reasons for requesting approval as soon as practicable but not later than the submittal of the raceway layout drawings. Do not make any departures without written approval.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ROUGH-IN

- A. Final Location: Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

3.2 ELECTRICAL INSTALLATIONS

- A. Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:

1. Coordinate electrical systems, equipment, and materials installation with other building components.
2. Verify all dimensions by making field measurements.
3. Arrange for chases, slots, and openings in other building components as construction progresses to provide for electrical installations.
4. Coordinate the installation of required supporting devices and sleeves to be set in cast-in-place concrete and other structural components, as they are constructed.
5. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum possible headroom.
7. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide all required connections for each service.
8. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Commissioner for resolution.
9. Where installed exposed in finished spaces, install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components.
10. Provide electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
11. Provide access panels or doors where units are concealed behind finished surfaces.
12. Install systems, materials, and equipment providing right-of-way priority to systems required to be installed at a specified slope.

3.3 CUTTING AND PATCHING

- A. General: Perform cutting and patching as specified in the General Conditions. In addition to the requirements specified in the General Conditions, the following requirements apply:
 1. Perform cutting, fitting, and patching of electrical equipment and materials required to:

- a. Uncover Work to provide for installation of ill-timed Work.
 - b. Remove and replace defective Work.
 - c. Remove and replace Work not conforming to requirements of the Contract Documents.
 - d. Remove samples of installed Work as specified for testing.
 - e. Install equipment and materials in existing structures.
 - f. Locate existing structural reinforcing with a pachometer where core drilled penetrations are required so as not to cut the steel reinforcing.
2. Cut, remove, and properly dispose of selected electrical equipment, components, and materials as indicated. Included are the removal of electrical items indicated to be removed and items made obsolete by the new Work. Deliver all removed serviceable apparatus to the City as directed.
 3. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
 4. Provide and maintain adequate temporary partitions or dust barriers that prevent the spread of dust and dirt to adjacent areas.
 5. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- B. Patch finished surfaces and building components using new materials that are compatible with the original installation and applied by experienced installers.

END OF SECTION 16050

SECTION 16055 – ELECTRICAL REQUIREMENTS FOR SHOP-ASSEMBLED EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for furnishing, installing and testing shop-assembled equipment as indicated, in accordance with the Contract Documents. Shop-assembled equipment panels and other items are specified under the driven equipment sections and may require external field connection to ancillary devices and other system components for interlocks and alarms. Provide all field wiring as required by the various systems and equipment specified under the driven equipment sections. This field wiring may not be specified or shown. This equipment includes but is not limited to the following:

1. Fan equipment
2. Miscellaneous control equipment
3. Overhead doors
4. Pump equipment
5. Sump pump equipment
6. Electric Gates

B. Related Sections

1. Division 8 Section "Overhead Coiling Doors."
2. Division 13 Section "Underground Storage Tanks."
3. Division 15 Section "Sump Pumps."
4. Division 15 Section "Fans."
5. Division 16 Section "Basic Electrical Materials and Methods."
6. Division 16 Section "Grounding."
7. Division 16 Section "Electrical Identification."
8. Division 16 Section "Wires and Cables - 600 Volts and Below."
9. Division 16 Section "Electrical Raceway Systems."
10. Division 16 Section "Wiring Devices."
11. Division 16 Section "Electric Motors."
12. Division 16 Section "Control Components and Devices."

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)
2. UL 486A - Wire Connectors and Soldering Lugs for Use with Copper
Conductors

- 3. NEC - National Electrical Code
- 4. NYCBC - New York City Building Code

1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Provide the Shop Assembled equipment using the components and appurtenances meeting the requirements specified in Division 16.

1.4 SUBMITTALS

- A. Product Data and Information: Furnish manufacturer's data on all equipment and devices in the assembly, including voltages, number of phases, current ratings, capacities and other relevant data.
- B. Shop Drawings: Furnish shop drawings for the shop-assembled equipment, including the following:
 - 1. Layout drawings of the assembly showing accurately scaled basic equipment sections, auxiliary compartments and combination sections. Show special relationships of assemblies to associated equipment, including plan and front views of the equipment. Furnish a device summary.
 - 2. Furnish wiring diagrams for assemblies that show connections to electrical power. Clearly differentiate between shop-installed portions of wiring and field installed portions.
 - 3. Furnish construction drawings for equipment requiring field assembly. Clearly differentiate between shop-assembled portions and field-assembled portions.
 - 4. A manufacturer's standard connection diagram or schematic showing more than one method of connection is not acceptable unless the intended method is clearly identified.

1.5 QUALITY ASSURANCE

- A. Codes: Comply with local codes and all other applicable codes.
- B. Regulatory Requirements: Comply with applicable Regulatory Agency requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.
- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.

- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 FABRICATION

- A. General: Provide shop-assembled equipment as standard products manufactured by companies regularly engaged in the manufacture of such equipment.
- B. Factory Assembled Requirements: Provide control panels for shop-assembled equipment as complete factory assembled units that require only external connections for installation including main disconnect and all electrical features necessary for the proper operation of the units.
- C. Control Panels shall comply with UL 508A and NEC 409.
- D. Controls:
 - 1. Motors 1/2 Hp and Larger:
 - a. Provide motors suitable for 480 volt, 3 phase, 60 hertz operation, with all controls at 115 volts or less.
 - b. Provide a combination circuit breaker along with all required control transformers, relays, timers, heaters and other necessary incidentals to form a complete functioning unit.
 - c. Provide NEMA Size 1 or larger starters.
 - 2. Motors less than 1/2 Hp
 - a. Provide motors suitable for 120-volt, single-phase operation.
 - b. Provide manual motor starter with neon pilot light.
 - 3. Provide all controls and equipment as specified in Division 16 Section "Control Components and Devices."
- E. Control Components: Install principal control components in NEMA 250 rated enclosures as follows:

<u>AREA</u>	<u>ENCLOSURE</u>
Above grade indoor in Salt Shed	NEMA -4X - Watertight and corrosion resistant with stainless steel external hardware. Provide all external operators made of the same materials as that of the enclosures

AREA	ENCLOSURE
Outdoor and indoor areas required to be water proofed or below grade elevation and not defined as corrosive or severe corrosive	NEMA 4 - Watertight
Corrosive and severely corrosive areas as defined in Division 16 Section "Basic Electrical Materials and Methods" or as shown.	NEMA 4X - Watertight and corrosion-resistant stainless steel with stainless steel external hardware. Provide all external operators made of the same materials as that of the enclosures

F. Miscellaneous Controls:

1. Provide float switches, pressure switches, limit switches, thermostats and other auxiliary control devices to satisfy the intended service.
2. Provide contacts rated at 10-amperes, 120 volts, 60 hertz ac, unless otherwise specified.
3. Provide limit switches that function in accordance with contact development charts.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install shop-assembled equipment as indicated, in accordance with manufacturer's written instructions.
- B. Coordination: Coordinate cabling and wiring as necessary to interface installation of shop-assembled equipment.
- C. Torque Requirements: Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals in accordance with UL Standard 486A.
- D. Grounding Connections: Make equipment grounding connections for the shop-assembled equipment as specified and shown. Tighten connections in accordance with UL Standard 486A to assure permanent and effective grounding.
- E. Adjustments: Make all necessary adjustments to the equipment to provide complete and satisfactory operation upon completion of the Contract.

3.2 CLEANING AND PAINTING

- A. Field Painting: Clean and touch up scratched and marred surfaces to match original finish.

END OF SECTION 16055

SECTION 16060 - GROUNDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing a complete grounding system as specified and shown. Grounding includes but is not limited to: electric equipment enclosures, transformers, switchgears, switchboards, generators, motor control centers and panelboards. Grounding also includes, equipment ground bus, ground grid systems, counterpoise, grounding rods, grounding conductors, bonding jumpers, metallic raceways, water pipe connections, and structure metal frames as required.
- B. Related Sections
1. Division 16 Section "Basic Electrical Materials and Methods."
 2. Division 16 Section "Electrical Testing Requirements."
 3. Division 16 Section "Wires and Cables - 600 Volts and Below."
 4. Division 16 Section "Electrical Raceway Systems."

1.2 REFERENCES

- A. Codes and Standards: The following codes and standards are referred to in this Section:
1. NEC - National Electrical Code
 2. NYCBC - New York City Building Code
 3. ASTM B187 - Copper Bus Bar, Rods and Shapes

1.3 SUBMITTALS

- A. Product Data and Information: Furnish manufacturer's catalog data for the following:
1. Grounding connectors, clamps and bushings
 2. Grounding rods
- B. Shop Drawings: Furnish shop drawings showing the locations of the grounding electrode components including the grounding rods, plates, access wells, counterpoise and all intersystem connections. Label the size and material used for grounding rods. Furnish details pertaining to grounding electrode conductors, grounding and grounded conductors, grounding connections and the ground grid for buildings, structures, lighting units, splice chambers,.
- C. Quality Control: Furnish a field report of the system ground impedance test results.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Construct a complete grounding system in accordance with applicable ANSI, IEEE Standards and the Electrical Code for the City of New York, NEC and local codes.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.
- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.
- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. Grounding and Grounded Conductors:
 - a. American Insulated Wire Corporation
 - b. Southwire
 - 2. Ground Plates:
 - a. Burndy Corporation
 - b. OZ/Gedney Company
 - c. Erico Products
 - d. Thomas & Betts
 - 3. Grounding Rods:
 - a. Harger Lightning Protection, Inc.
 - b. Thomson Industries, Inc.
 - c. Erico Products
 - d. Superior Grounding Systems
 - 4. Ground Rod Access Box:
 - a. Strongwell - Quazite
 - b. Hartford Concrete Products, Inc.

2.2 MATERIALS

- A. General: Provide conductor sizes as shown or required.

- B. Materials: Provide conductors in accordance with the requirements specified in Division 16 Section "Wires and Cables - 600 Volts and Below."
- C. Bare conductors: Provide bare copper conductor where buried in earth, embedded in concrete or exposed.
- D. Insulated Conductors: Provide copper conductor with green color insulation rated at 600 volts where installed in conduits or other enclosed raceways.
- E. Provide exposed copper ground bus on walls in switchgear, electric and communication equipment rooms where indicated.

2.3 CONNECTORS

- A. Grounding Clamps and Bolted Connectors: Provide grounding clamps and bolted connectors suitable for devices or cables being connected.
- B. Ground Plates: Provide two-hole, cast, copper alloy, ground plates suitable for installation in concrete. Fabricate the ground plates with two 1/2-inch diameter threaded holes and a 4/0 stud for connection to the grounding system.
- C. Welding: Provide the exothermic welding process for buried, concealed and accessible connections to structural members, ground rods, and case grounds. Clean and paint welds embedded in the ground or encased in concrete with asphalt base paint.
- D. Bolted Connectors: Provide bolted connectors for exposed connections to ground buses and equipment.
- E. Pipe Grounding: Provide copper, brass, or bronze grounding clamps for grounding pipes. Do not provide strap type clamps.
- F. Grounding Bushings: Provide grounding bushings for conduits where conduits are not effectively grounded by firm contact to the grounded enclosure and where the raceway is required to be bonded at both ends.

2.4 GROUNDING RODS

- A. Length and Size: Provide grounding rods 3/4-inch in diameter and 10 feet long.
- B. Grounding Rod Material: Stainless steel.

2.5 GROUNDING ELECTRODE

- A. The grounding electrode shall consist of a three rod counterpoise installed in accordance with the Contract Drawings.

2.6 Bonding

- A. The metallic roof drain piping shall be bonded using a UL approved pipe bonding clamp and a #2 AWG bonding jumper in Schedule 40 PVC conduit. Conduit shall be routed on the interior building wall and placed so as to protect it from physical damage.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install conductors to preclude exposure to physical damage.
2. Install connections firm and tight.
3. Arrange conductors and connectors without placing strain on the connections.
4. Bury equipment grounding conductors as shown, or at a minimum of 12 inches below grade.
5. Bring loops or taps up for connection to equipment or other items to be grounded.
6. Install an insulated grounding conductor in all conduits.
7. When raceways are used to contain and protect grounding conductors, install in accordance with Division 16 Section "Electrical Raceway Systems," the Electrical Code for the City of New York and the NEC.
8. Where conductors are installed in nonmetallic raceway, provide the grounding conductor in addition to the neutral wire, sized in accordance with Electrical Code for the City of New York and NEC or as scheduled.
9. Perform exothermic welding with properly sized molds and in strict compliance with the manufacturer's instructions.

B. Grounding Rod Installation:

1. Install grounding rods as shown with the top of the rod a minimum of 12 inches below grade.
2. Drive grounding rods into permanently moist soil.
3. Provide additional ground rod sections as required to reach permanently moist soil.
4. Provide cast iron junction box without bottom for access to grounding rod and conductor where shown.

C. Ground Electrodes:

1. Connect building reinforcing steel, mechanical, and plumbing work to the Grounding Electrode Conductor in compliance with the NYCEC.

D. Equipment Grounding:

1. Ground each piece of electrical equipment using a conductor in the raceway feeding the equipment in accordance with Electrical Code for the City of New York and NEC.
2. Unless specified otherwise, connect transformer enclosures and neutrals to the grounding system. Connect the neutral ground connection at the transformer terminal. Make the connection from the ground grid to the ground bus and enclosures of switchgears and motor control centers, lighting and distribution panelboards, and control, relay and instrumentation panels.
3. Provide two separate, independent, diagonally opposite connections for power transformers so removal of one connection will not impair continuity of the ground system. Provide ground plates that are imbedded in the concrete pad so that transformers can be removed without damaging grounding system. Install a copper ground connect between ground plates and the transformers.

E. Grounding Conductors: Connect the grounding conductor between the equipment and the grounding system. Where a ground bar is furnished with the panelboard, connect the grounding conductor to the bar.

F. Miscellaneous Grounding: Provide grounding for the following:

1. Ground receptacles and switches and their metal plates through positive ground connection to the yoke/strap, outlet box and grounding system grounding wire installed in the conduit.
2. Ground racks, supports, frames, covers and metal parts in manholes or handholes, controllers, motor frames, surge capacitors, arrestors, lighting fixtures, metal structures (including fences), exposed noncurrent carrying metal, mechanical equipment, hoist beams, cranes, generator frames and similar items.

3.2 FIELD QUALITY CONTROL

Tests: Conduct a witnessed test to determine the ground impedance for the entire system using a ground loop impedance tester. Disconnect the ground loop from the system neutral and intersystem bonds, for the duration of the test. A maximum impedance of 2 ohms shall be read at any test location. Add additional grounding rods if necessary to meet this requirement. Reconnect the system neutral when the test is complete.

END OF SECTION 16060

NO TEXT ON THIS PAGE

SECTION 16071 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing supporting devices for electrical equipment and raceways in accordance with the Contract Documents. The supporting devices shall be a complete system for the equipment. The work shall include providing all required support devices to properly mount and secure all equipment furnished under this Contract. This section also includes equipment anchorage and restraints suitable to meet the specified seismic requirements.
- B. Related Sections:
 - 1. Division 16 Section "Basic Electrical Materials and Methods."
 - 2. Division 16 Section "Electrical Raceway Systems."

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM A569 - Specification for Steel, Carbon, Hot-Rolled Sheet and Strip Commercial Quality
 - 2. ASTM A570 - Specification for Steel, Sheet and Strip, Carbon, Hot- Rolled, Structural Quality
 - 3. ASTM B633 - Specification for Electrodeposited Coatings of Zinc On Iron and Steel
 - 4. AISI - Standard for Stainless Steel
 - 5. MFMA-1 - Standard Publication for Metal Framing
 - 6. ANSI/NFPA 70 - National Electrical Code
 - 7. New York City Construction Codes

1.3 SUBMITTALS

- A. General: Furnish all submittals, including the following, as specified in General Conditions and Division 16 Section "Basic Electrical Materials and Methods."
- B. Contractor shall submit working drawings, shop drawings and material specifications for the approval of the Commissioner.
- C. Product Data: Furnish manufacturers catalog cuts for the supporting devices proposed for use with specifications and other data required to demonstrate compliance with the specified requirements.

- D. Working Drawings: Furnish scaled working drawings showing dimensions and locations of all items and clearance requirements.

1.4 QUALITY ASSURANCE

- A. Codes: Provide all materials and workmanship to meet the requirements of the Electrical Code for the City of New York and ANSI/NFPA 70 National Electrical Code.

- B. Regulatory Requirements: Provide UL listed components.

- C. Design Standard: Design all support devices as follows:

1. All channels, fittings and hardware used in the supporting system shall be in accordance with MFMA standards and guidelines.
2. The design of the support system shall be the responsibility of the contractor. The contractor shall provide the proper sized rods, channels, fittings, brackets and appurtenances necessary to adequately support the equipment.
3. Quality Control: Furnish a signed and sealed certification from a licensed professional engineer registered in New York stating that the design calculations and drawings for the support details for equipment exceeding 50 pounds in weight were prepared by that licensed professional engineer or under his direct supervision.

- D. Seismic requirements: Provide support devices designed for following seismic requirements:

1. Equipment assemblies such as secondary unit substations, switchgear, motor control centers and panelboards shall be certified to meet seismic requirements in accordance with the requirements specified in the applicable sections of the general and detailed specifications.
2. The Contractor shall provide equipment anchorage details for all equipment certified to meet seismic requirements. The details shall be coordinated with the manufacturer's equipment mounting provisions.
3. Electric raceways shall include seismic supports and restraints

- E. Quality Control: Furnish a signed and sealed certification from a licensed professional engineer registered in New York stating that the design calculations and drawings for the seismic anchorage and restraint details were prepared by that licensed professional engineer or under his direct supervision.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.

- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.
- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. Allied Tube and Conduit.
 - 2. B-Line Systems, Inc.
 - 3. Kindorf.
 - 4. Unistrut

2.2 CHANNELS, FITTINGS AND BRACKETS

- A. Provide channels, fittings, brackets and related hardware for mounting and supporting the electrical equipment. Anchor bolts, concrete inserts and related hardware for proper support of equipment shall also be provided. All equipment necessary to meet the seismic requirements specified shall be provided.
- B. Provide channels conforming to ASTM A569 or A570. Channels shall have a minimum thickness of 12-gauge. The cross sectional width dimension shall be 1-1/2 inch minimum. The depth shall be as required to satisfy load requirements.
- C. Provide factory punched attachment holes, when required, on hole centers approximately equal to the cross sectional width and 9/16-inch diameter.
- D. Provide fittings and brackets having 9/16-inch diameter holes on centers identical to the channel or as required to align with the channel holes. Provide fittings and brackets having the same width as the channel and shall be 1/4 inch thick minimum. Provide fittings and brackets that mates properly with the channel.
- E. Provide all channels, fittings, brackets and related hardware manufactured from steel and having an electro-plated zinc finish according to ASTM B633.
- F. In corrosive areas, provide ASTM type 316 stainless steel or PVC coated channels, fittings, brackets and related hardware. In severe corrosion areas only 316 Stainless Steel will be accepted.

2.3 CONDUIT HANGERS, SUPPORTS AND INSERTS

- A. Provide channels, rods, straps, anchors and related hardware for support of the exposed electric conduit system as specified in Division 16 Section "Electrical Raceway Systems."

- B. Provide anchor bolts, concrete inserts and related hardware for proper support of equipment. Provide all equipment necessary to meet the seismic requirements.
- C. Provide conduit hangers, supports and inserts in accordance with Division 16 Section "Electrical Raceway Systems."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide all supporting devices installed level, parallel and perpendicular to building walls and floors, such that the support system is installed in a neat and professional manner.
- B. Provide all holes in hung ceilings for support rods and other equipment made adjacent to bars where possible, to facilitate removal of ceiling panels.
- C. Provide channels, fittings and brackets that are rigidly bolted together and braced to make a substantial supporting framework support system.
- D. Where motor control centers, switchgear unit substations and other electrical equipment are being installed on concrete pads, furnish leveling channels to the General Construction Contractor for installation in the concrete pads. Anchor seismic certified equipment in accordance with the seismic anchorage details.
- E. Provide all equipment fastenings to steel columns, beams and trusses by beam clamps. In lieu of beam clamps, equipment may be welded to steel structures, subject to Commissioner approval.
- F. Do not drill holes in any steel columns, beams and trusses.
- G. Provide hanger rod supports installed such that threaded rod is parallel and perpendicular to building walls and floors.

END OF SECTION 16071

SECTION 16075 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing materials for the identification of electrical equipment, components, conduits, cables and wiring, and furnishing and installing safety signs.

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:

1. ANSI C2 - National Electrical Safety Code (NESC)
2. ANSI Z535.1 - Safety Color Code
3. ANSI Z535.2 - Environmental and Facility Safety Signs
4. ANSI Z535.3 - Criteria for Safety Symbols
5. OSHA - Occupational Safety and Health Act

1.3 SUBMITTALS

- A. Product Data and Information: Furnish manufacturer's catalog data for safety signs, nameplates, labels and markers.
1. Furnish manufacturer's instructions indicating application conditions and limitations of use; and storage, handling, protection, examination and installation of product.
- B. Contractor's Record Drawings: Furnish Contractor's record drawings accurately showing actual location of markers for underground ducts, handholes and manholes, at completion of the Project.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.
- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.
- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

1.5 SPARE PARTS

- A. Furnish the following spare parts.
 - 1. Ten safety signs of each size and wording.
- B. Packaging: Package spare parts in containers bearing labels clearly designating contents. Identify all spare parts with information needed for reordering. Deliver spare parts in original factory packages.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. W. H. Brady Company
 - 2. Seton
 - 3. Thomas & Betts

2.2 MATERIALS AND COMPONENTS

- A. General: Provide identification materials listed and classified by UL or tested by an acceptable Electrical Testing Company certifying the equivalence of the materials to UL listing requirements and OSHA approved.
- B. Laminated Plastic Nameplates: Provide engraved three-layer laminated plastic nameplates with black letters on white background and fastened with corrosion-resistant screws. Do not use mounting cement for fastening nameplates.
 - 1. Provide nameplates with 1-inch high lettering for switchgears, switchboards, motor control centers, control panels, relay panels, contactor panels, panelboards, and similarly grouped equipment, transformers and disconnect switches.
 - 2. Provide nameplates with 1/2-inch high lettering for individual components of a group such as main breakers, switchgear units, switchboard units, motor control center units and similar devices.
 - 3. Provide nameplates with 1/4-inch high lettering for remote motor controllers, control stations, relays and similar equipment.
 - 4. Provide nameplates for each motor identifying service or function and lettering of an appropriate size to suit each motor.
 - 5. Provide approved laminated directories of circuits with typewritten designations of each branch circuit in each panelboard.
 - 6. Provide smaller lettering for a neat, legible nameplate where the amount of lettering causes excessively large nameplates.

- C. Wire Markers: Identify wire bundles and each individual wire.
 - 1. Wire bundles: Provide a brass or rigid fiber identifying tag attached with nylon self locking "Ty-Raps".
 - 2. Wire identification markers: Provide a printed white, heat-shrink, seamless tubing type with black bold lettering for wires size No. 10 AWG and smaller. Provide a printed self-laminating white, vinyl type with black bold lettering for wires No. 8 AWG and larger.
- D. Safety Signs: Provide safety signs in accordance with OSHA standard meeting the requirements of ANSI C2, ANSI Z535.1, ANSI Z535.2 and ANSI Z535.3.
 - 1. Provide safety signs manufactured from vinyl having a minimum thickness of 60 mils with red and black letters and graphics on a white background.
 - 2. Size: 10 inches by 14 inches except signs 7-inch by 10-inch may be provided where the larger size cannot be applied.
 - 3. Mount safety signs using corrosion-resistant screws. Do not use mounting cement.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Degrease and clean surfaces to receive nameplates, labels and marking paint.

3.2 INSTALLATION

- A. General: Install nameplates on the front of equipment, parallel to the equipment lines and secured with corrosion resistant screws.
 - 1. Install laminated nameplates identifying:
 - a. Each electrical equipment enclosure
 - b. Individual equipment and devices
- B. Wire Markers: Identify wire bundles and each individual wire with identification tags as follows:
 - 1. Wire Bundles: Install an identifying tag engraved with the conduit number where conduits enter motor control centers, switchgear, switchboards, control panels, terminal boxes and the like.
 - 2. Wire identification markers: Provide wire identification markers on each wire at all termination points.
 - a. On power and lighting circuits: The branch circuit or feeder number as indicated on drawings.

- b. On control circuits terminated in motor control centers, switchgears, control panels and alike: The field device and terminal number of the opposite end connection.
 - c. On control circuits at each field device: The panel or compartment number and terminal number of the opposite end connection.
3. Oversize wire markers so that after heat shrinking the wire marker can be rotated on the wire. Rotate wire markers so that wire identification number is visible.
- C. Safety Signs: Provide safety signs as follows or as shown:
- 1. Type DS-2:
 - a. Wording: "DANGER - ELECTRICAL EQUIPMENT, AUTHORIZED PERSONNEL ONLY."
 - b. Location: At each entrance to electrical rooms, and enclosed outdoor electrical equipment.
 - 2. Type DS-5:
 - a. Wording: "DANGER - POWERED FROM MORE THAN ONE SOURCE."
 - b. Location: Outside all equipment that operates from more than one power source.
 - 3. Type DS-6:
 - a. Wording: "NOTICE - KEEP DOOR CLOSED."
 - b. Location: On all doors with another safety sign installed.
 - 4. Type DS-7:
 - a. Wording: "CAUTION - CONTROLS & INTERLOCKS POWERED FROM MULTIPLE SOURCES."
 - b. Location: On all control panel doors.

END OF SECTION 16075

SECTION 16080 - ELECTRICAL TESTING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements of field acceptance testing of materials and equipment provided under various other sections to determine suitability for installation and energization. Requirements of field testing and certification of electrical equipment and materials provided under various other sections to assess their equivalence to UL Inc. listing/labeling.

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
1. NETA - International Electrical Testing Association.
 2. NIST - National Institute of Standards and Technology.

1.3 SUBMITTALS

- A. Furnish all submittals including the following, as specified in General Conditions and Division 16 Section "Basic Electrical Materials and Methods."
1. Acceptance Testing Reports: Furnish acceptance testing reports for all equipment and materials (other than manufacturers' standard listed and labeled products) including the following information:
 - a. Summary of the test.
 - b. Description of material or equipment tested.
 - c. Description of test including acceptable test values.
 - d. Test results.
 - e. Analysis of test results with recommendations.
 2. UL Testing: Furnish standard test parameters in accordance with the acceptable codes and standards for all the equipment and materials tested for equivalence to UL listing.
 3. UL Test Reports and Certificates: Furnish test reports and certificates for all equipment and materials tested for equivalence to UL listing, for approval.

PART 2 - PRODUCTS

2.1 TESTING COMPANIES

- A. Acceptable testing companies are as listed below:
1. MET Electrical Testing Co., Inc.
 2. ASET Power Systems Services, Inc.

3. Electric Power Systems, Inc.
4. Electro-Test, Inc.
5. High Voltage Maintenance Corp.
6. UL Underwriters Laboratories, Inc.
7. Other OSHA and NETA approved testing facilities.

2.2 SOURCE QUALITY CONTROL

- A. Tests: Furnish all testing and certification in accordance with the latest NETA, ANSI, IEEE and NEMA Standards to meet the UL requirements, NFPA Standards, Electrical Code for the City of New York and NEC.
- B. Test Equipment: Furnish all testing equipment, cables and appurtenances required to perform all tests and certifications in accordance with the following:
 1. Use instruments that have been calibrated, to assure that they are within rated accuracy in accordance with NIST.
 2. Select test instruments that are appropriate for the variable being measured.

PART 3 - EXECUTION

3.1 UL TESTING AND CERTIFICATION

- A. Furnish the test reports and certifications for UL equivalence prior to acceptance of all materials and equipment requiring such tests and certifications.

3.2 ACCEPTANCE TESTING

- A. Furnish acceptance test reports prior to acceptance of all materials, equipment and installations requiring such tests.

END OF SECTION 16080

SECTION 16121 - WIRES AND CABLES - 600 VOLTS AND BELOW

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing all wires and cables rated at 600 volts and below for complete electrical systems as shown.
- B. Related Specifications:
 - 1. Division 16 Section "Temporary Electrical System"
 - 2. Division 16 Section "Basic Electrical Materials and Methods."
 - 3. Division 16 Section "Electrical Requirements for Shop Assembled Equipment"
 - 4. Division 16 Section "Grounding"
 - 5. Division 16 Section "Electrical Identification.
 - 6. Division 16 Section "Lighting Equipment Lamps and Ballasts"
 - 7. Division 16 Section "Lighting Control System"
 - 8. Division 16 Section "Electrical Monitoring System"

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM B 3 - Standard Specifications for Soft or Annealed Copper Wire
 - 2. ASTM B 8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
 - 3. TIA/EIA 568-A - Commercial Building Telecommunications Cabling Standard
 - 4. ICEA - Insulated Cable Commissioners Association
 - 5. NYCCC - New York City Construction Code.

1.3 SUBMITTALS

- A. Furnish all submittals, including the following, as specified in General Conditions and Division 16 "Basic Electrical Materials and Methods."
- B. Product Data and Information: Furnish manufacturer's catalog data for each type of wire and cable furnished.

1.4 QUALITY ASSURANCE

- A. General: Furnish wire and cable in accordance with applicable IEEE and NEMA standards, meeting the requirements of the NYCCC, NEC and UL listed.

- B. Tests: Furnish cables factory tested prior to shipment in accordance with ICEA standards for the insulation specified.
- C. Installer Qualifications: Installer of communications or control cabling must have on staff personnel certified by Building Industry Consulting Service International.
 - 1. Installation Supervision: Installation of communications or control cabling shall be under the direct supervision of a registered technician.
- D. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory.
 - 1. Testing Agency's Field Supervisor: Person currently certified by Building Industry Consulting Service International as a Registered Communications Distribution Designer (RCDD) to supervise field quality control testing of communications or control cabling.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle wire and cable in accordance with the manufacturer's instructions and as specified in General Conditions.
- B. Store cable reels on concrete or other hard surface or on 2x4 wood laggings.
- C. Store cable reels upright resting on the edges of both flanges – do not lay reels on one flange

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. Wire and Cable:
 - a. American Insulated Wire Corporation
 - b. Southwire Company
 - c. General Cable Company
 - 2. Instrumentation Cable:
 - a. Belden
 - b. Dekoron
 - c. The Okonite Company
 - 3. Multiconductor Cable:
 - a. The Okonite Company
 - b. Southwire Company

4. Voice, Data (Local Area Network), Data Highway, Access Control System, Digital Video and Fire Alarm Cables:
 - a. Berk Tek
 - b. CommScope - Systimax
 - c. Belden

5. Wire Connector:
 - a. Thomas & Betts
 - b. 3M Electrical Products Division
 - c. Ideal

6. Color Coding Marker:
 - a. W. H. Brady Company
 - b. Thomas & Betts
 - c. 3M Electrical Products Division

2.2 MATERIALS

A. Conductors: Provide soft drawn or annealed copper conductors with 98 percent minimum conductivity, meeting requirements of ASTM B 3 (solid) or ASTM B 8 (stranded). Use stranded conductors except solid No. 12 AWG may be used in lighting fixture and convenience outlet wiring.

B. Insulation: Provide wires and cables with insulation as follows:

1. Power, control and lighting wiring

a. Single Conductor: Provide insulation as follows:

<u>Conductor Size</u>	<u>NEC Type Letter</u>	<u>Insulation Material</u>
Nos. 14, 12 and 10 AWG	XHHW	Cross-linked Polyethylene
No. 8 AWG and Larger up to and including 500 kcmil.	RHW	Cross-linked Polyethylene
600 kcmil and Larger	XHHW	Cross-linked Polyethylene

b. Multiconductor Cables: Insulate individual conductors with 15 mils of polyethylene or PVC and 4-mil nylon jacket. Wrap the conductors with binder and an outer jacket not less than 45 mils of PVC. Use ICEA Method 1 for color coding wires.

2. Instrumentation Wiring: The manufacturers' name and catalog number shown below are for the purpose of establishing quality and general configuration.
 - a. Two conductor or single pair: Stranded No. 16 AWG wire, 600 volt polyethylene insulation, twisted conductors, tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and outer jacket of PVC. Belden Cat. No. 8719.
 - b. Three Conductor: Stranded No. 16 wire, 600 volt polyethylene insulation, twisted conductors, tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and outer jacket of PVC. Belden Cat. No. 8618.
 - c. Multiple Pairs or Triads: Provide individually shielded pairs or triad of stranded No. 16 AWG wire with overall shield. Insulate each wire for 600 volts with 15 mils of PVC and a 4-mil nylon jacket. Assemble pairs or triads with tinned copper drain wire and metalized tape shield providing 100 percent shield coverage. Cable pairs or triads together with tinned copper drain wire and overall metalized tape shield.
 3. Fire Alarm Cable: Provide cables compatible with the fire alarm components specified in the contract drawings or other sections of this Specification. The manufacturers' name and catalog number shown below are for the purpose of establishing quality and general configuration.
 - a. Plenum Cable: Provide NEC Type FPLP cable consisting of two solid conductor No.16 AWG, 300 volt PVC insulation, tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and red Flam arrest outer jacket. Belden Cat. No. 6220FK.
 - b. Riser Cable: Provide NEC Type FPLR-CIC cable consisting of two solid conductor No.16 AWG, 300 volt silicone rubber insulation with tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and red FRPE outer jacket. Belden Cat. No. 5220FZ.
 - c. General Purpose Cable: Provide NEC Type FPL cable consisting of two solid conductor No.16 AWG, 300 volt foam high-density polyethylene insulation with tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and red PVC outer jacket. Belden Cat. No. 5220FJ.
- C. Printed Data on Covering: Provide the following information printed on the surface of all wires and cables at regular intervals throughout the entire length.
1. Manufacturer or trade name
 2. Size of conductor
 3. Type of insulation
 4. Voltage classification

2.3 WIRE CONNECTIONS AND CONNECTING DEVICES

- A. Connectors for No. 10 AWG and Smaller: Provide insulated compression type butt connectors.
- B. Connectors for No. 8 AWG and Larger: Provide UL, Inc. listed compression type tube connectors for parallel or butt splices. Provide companion preformed plastic insulating covers or tape to provide insulation equal to conductor insulation.
- C. Miscellaneous Connectors: Provide preinsulated spring connectors for lighting and receptacle splices and pigtails.
- D. Solderless Lugs: Provide solderless terminal lugs for stranded and multiple solid conductors at connection to terminals or use UL listed crimp tool compression style lugs.
- E. Control Wire Terminations: Provide spade lug or pressure type control conductor connection terminations for control wiring terminations. Provide lug bolting at devices or bus bars with a flat washer, a Belleville washer and a locknut.

2.4 COLOR CODING

- A. Use a vinyl impregnated cloth tape resistant to oil, dirt and heat for conductor color coding.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Swab new and existing conduits to be used to clear debris and remove moisture before conductor installation. Install conductors in raceways with no splices between boxes.
- B. Pulling Equipment:
 - 1. Pull conductors using proper equipment without exceeding manufacturer's recommendation for maximum pulling tension. Protect conductor insulation jacket at all times from twists, kinks, scrapes, punctures and other damage. Replace damaged conductors. Pull wires and cables into ducts and conduit without the use of lubricants, except where such use is necessary and approved by the cable manufacturer and the Commissioner. Use UL listed lubricating compound compatible with the conductor insulated jacket and with the raceway.
 - 2. Use lines of nylon or polypropylene, propelled by carbon dioxide, or compressed air, to snake or pull wire and cable into conduits. Do not use flat steel tapes or steel cables.
- C. Conductor Support: Support conductors in vertical risers with woven grips to prevent loading on conductor connectors.

- D. Seals: Provide a seal between the conductor and conduit for conduits entering buildings or from areas where the temperature change may cause condensation or moisture. Seal the conduits after the conductors are in place.
- E. Identification: Identify all cables as specified in Division 16 Section "Electrical Identification."
- F. Color Coded Tape:
 - 1. Apply color coding tape at all terminations and splices with overlapping turns for a minimum length of two inches, starting two inches back from the termination point. Provide color code tape in all boxes and manholes.
 - 2. Provide color coding throughout the entire network for service, feeder, branch, control and low energy signal circuit conductors. Use the following color code for conductors.

<u>SYSTEM</u>	<u>COLOR CODING</u>				
	<u>PHASE A</u>	<u>PHASE B</u>	<u>PHASE C</u>	<u>NEUTRAL</u>	<u>GROUND</u>
208Y/120 three phase	Black	Red	Blue	White	Green
240/120 Single phase	Black	Red	Blue	White	Green
480 & 480Y/277 three phase	Brown	Orange	Yellow	White	Green
Control and low- energy signal	Red	---	---	White	Green
Gas Fire De- tection and Alarm Systems	Red	---	---	---	---
Instru- mentation	Tan	---	---	---	---

- G. Terminations: Leave a minimum of six inches of free conductor at each connected outlet and a minimum of nine inches at unconnected outlets.
- H. Code Requirements: Install wiring in accordance with applicable provisions of the Electrical Code for the City of New York, the National Electrical Code, and as indicated.

- I. Conductor Sizing: Size conductors in accordance with the Electrical Code for the City of New York, NEC and the following:
1. Size for branch lighting circuits so that the greatest voltage drop between lighting panel and center of load does not exceed two percent at rated load.
 2. Size conductors to limit the maximum conductor temperature to less than 75 degrees C, except where specifically stated otherwise.
 3. Use minimum conductor sizes as follows:
 - a. Power and lighting branch circuits, No. 12 AWG
 - b. 120 volt control circuits, No. 14 AWG
 - c. Instrumentation and signal wiring, 2 or 3 conductors No. 16 AWG stranded shielded
 4. Size conductors as shown or as required by the actual load to be served, whichever is larger.
- J. Splicing: Install continuous cables without splices in all duct systems.
- K. Instrumentation wiring: Install instrumentation wiring as follows:
1. Wherever possible provide continuous instrumentation wiring without splices from field device to instrument. Where connections are required, make all connections in terminal boxes.
 2. Terminate instrumentation wiring at terminal blocks only.
 3. Where instrumentation wire is required to be connected in a terminal box, provide an isolated terminal for each shield.
 4. Ground instrumentation shields and drain wires only at the panel end of loop.
 5. Install clear, heat-shrink, seamless tubing over exposed shields and drain wires in all terminal boxes, junction boxes, panels and field devices.
- L. Accuracy of Information: The number and sizes of wires and conduits indicated are for guidance only and are not necessarily the correct number and sizes necessary for actual equipment installed. Install as many wires and conduits of the required size as necessary for a complete electrical system, and provide adequately for the equipment actually installed.

3.2 CONDUCTOR IDENTIFICATION

- A. Labeling: Label each wire at both termination points and at each splice point in junction boxes. Carry individual conductor or circuit identification throughout, with circuit numbers or other identification clearly stamped on terminal boards and printed on directory cards in distribution cabinets and panelboards.

- B. Identification: Where the total number of control and signal wires is three or more and no terminal board is provided, identify each wire in junction boxes and cabinets by means of plastic slip-on wire marker.
- C. Plastic Tags: In manholes, identify each wire by laminated plastic tag located so it can be easily seen.
- D. Color Coordination: Connect circuit conductors of the same color to the same phase throughout the installation.

3.3 WIRE AND CABLE CONNECTIONS TO EQUIPMENT

- A. Provide electrical connections to all equipment in strict accordance with the manufacturer's approved wiring diagrams, the Plans, or as approved. Repair or replace any damaged equipment resulting from erroneous connections.

3.4 CONNECTOR AND TERMINAL LUG INSTALLATION

- A. UL Requirements: Install all connectors and terminal lugs in accordance with UL requirements and manufacturer's recommendations.

3.5 QUALITY ASSURANCE

- A. Field Tests: Test the following 600 volt wires and cables after installation but before final connections are made up in accordance with Division 16 Section "Electrical Testing Requirements":
 1. All secondary feeders from the Utility transformers
 2. All feeders between and from the low voltage switchgear assemblies
 3. All feeders from motor control centers to motors 30 hp and larger
 4. All feeders from motor control centers, to lighting panels and dry type transformers
 5. For the above listed cables, apply a test voltage of 1,500 volts ac for a period of 1 minute between all conductors in the same conduit, and between each conductors and ground.
- B. Test Results: Make all tests and submit certified test results. Replace any cables that fail the tests.
- C. Continuity Test: Perform continuity test to demonstrate proper cable connection.

END OF SECTION 16121

SECTION 16130 - ELECTRICAL RACEWAY SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing electrical raceway systems as indicated, in accordance with the Contract Documents.
- B. Related Specifications:
 - 1. General Conditions
 - 2. Division 9 Section "Painting."
 - 3. Division 16 Section "Basic Electrical Materials and Methods."
 - 4. Division 16 Section "Supporting Devices."
 - 5. Division 16 Section "Underground Electrical Distribution System."

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ANSI C80.1 - Specifications for Rigid Steel Conduit, Zinc Coated
 - 2. ANSI C80.3 - Specifications for Electrical Metallic Tubing, Zinc Coated
 - 3. ANSI/NFPA 70 - National Electrical Code
 - 4. NEMA RN1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit..
 - 5. NEMA TC2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and -80)
 - 6. NEMA TC14 - Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
 - 7. UL 1 - Flexible Metal Conduit
 - 8. UL 6 - Rigid Metal Conduit
 - 9. UL 360 - Liquid-Tight Flexible Steel Conduit
 - 10. UL 651 - Schedule 40 and 80 Rigid PVC Conduit
 - 11. UL 797 - Electrical Metallic Tubing
 - 12. ETL PVC001 - Intertek SEMKO Coating Adhesion Test
 - 13. NYCCC - New York City Construction Code

1.3 SUBMITTALS

- A. Furnish all submittals as specified in General Conditions and Division 16 Section "Basic Electrical Materials and Methods."

1.4 QUALITY ASSURANCE

- A. Codes: Provide all materials and workmanship to meet the requirements of the NYCCC and ANSI/NFPA 70 National Electrical Code.
- B. Regulatory Requirements: Provide UL listed components.
- C. Provide verification of PVC coated raceway and fitting coating compliance with references and applicable standards.
- D. DELIVERY, STORAGE AND HANDLING Deliver, store and handle all products and materials as specified in General Conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. Rigid Steel Conduits and Electrical Metallic Tubing
 - a. Allied Tube and Conduit
 - b. Wheatland Tube Company
 - c. LTV Steel Tubular Products Company
 - 2. PVC Coated Steel Conduits Fitting and Boxes
 - a. KorKap
 - b. Perma-Cote Industries
 - c. Plasti-bond
 - 3. Rigid Nonmetallic Conduits
 - a. Carlon Company
 - b. Certainteed Corporation
 - c. National Pipe Company
 - 4. Liquidtight Flexible Steel Conduit
 - a. Electri-Flex Company
 - b. The International Metal Hose Co.
 - c. Alflex Corp.
 - d. Anamet, Inc.

5. Conduit Fitting and Connectors

- a. Appleton Electric Company
- b. Thomas & Betts
- c. Crouse Hinds Company
- d. OZ/Gedney Company
- e. Killark
- f. Adalet-PLM

6. Boxes and Enclosures

- a. Appleton Electric Company
- b. Raco/Bell
- c. Crouse Hinds Company
- d. Thomas & Betts
- e. Hoffman
- f. Hope
- g. OZ/Gedney Company

7. Fire Stop System

- a. 3M/Electrical Products Division
- b. International Protective Coatings
- c. Nelson Electric

8. Terminal Blocks

- a. Phoenix Contact
- b. Entrelec
- c. Weidmuller

2.2 RACEWAYS

- A. Provide minimum 3/4-inch raceways.
- B. Provide rigid steel, heavy wall, hot-dip galvanized in accordance with the requirements of UL-6 and ANSI C80.1.
- C. Provide PVC coated rigid steel in accordance with the requirements for rigid steel raceway herein and with 40 mils bonded PVC exterior coating meeting requirements of NEMA RN-1. Provide a nominal 2 mil urethane interior coating and a clear urethane coating over the galvanized threads.
- D. Provide rigid nonmetallic Schedule 40 PVC conduit in accordance with requirements of NEMA TC2 and UL 651 with solvent cement joints.
- E. Provide liquidtight flexible single strip steel, hot-dip galvanized conduit with PVC jacket in accordance with requirements of UL 1. Provide a continuous copper bonding conductor wound spirally between convolutions on the inside of the conduit meeting requirements of UL 360 for conduit sizes 1-1/4-inch and smaller.

2.3 FITTINGS

- A. General: Provide fittings of similar material as raceways.
- B. Fittings Requirements: Provide fittings meeting the following requirements:
 - 1. Set screw or indenter type fittings are not acceptable. Provide threaded connectors for all rigid metal conduits.
 - 2. Provide solvent cement connections for all rigid nonmetallic conduits.
 - 3. Provide gland compression type fittings for all electrical metallic tubing. Provide insulated type box connectors.
 - 4. Provide insulated connectors for liquidtight flexible conduit.
 - 5. Expansion/Deflection Fittings
 - a. Provide a deflection and expansion coupling for rigid conduits that have a $\frac{3}{4}$ inch movement in all directions from normal and a 30 degree angular deflection. Provide coupling that includes internal bonding jumper.
 - b. Provide a nonmetallic expansion coupling for nonmetallic conduits that have a 4-inch maximum expansion.
 - 6. Bushings
 - a. Provide insulated nonmetallic bushing rated 105 degrees C for all installations where bonding is not required.
 - b. Provide insulated metallic grounding and bonding bushing rated 150 degrees C where bonding is required.
 - 7. Fittings for Hazardous Locations:
 - a. Provide fittings that conform to the requirements of NEC Chapter 5 for Class I, Division 1 or 2, Group D hazardous locations as defined in Division 16 Section "Basic Electrical Materials and Methods" or as shown.
 - b. Provide seal fittings designed for 40 percent fill capacity suitable for either horizontal or vertical installation.

2.4 WALL AND FLOOR PENETRATIONS

- A. Watertight:
 - 1. For conduit penetrations in new exterior walls or floors provide watertight sealing sleeves consisting of a steel sleeve with pressure ring and clamps.

2. For conduit penetrations in existing walls or floors, provide watertight sealing bushing consisting of a neoprene sealing ring between two PVC coated steel pressure discs. Provide stainless steel captive screws for sealing ring compression.

B. Fire-proofing Through Fire Rated Construction:

1. Provide a permanent fire stop system for all penetrations through fire-rated walls, partitions and floors.
2. Design fire stop system to maintain the integrity of the wall or floor assembly for its rated time period.
3. Arrange fire stop system to allow normal pipe movement without being displaced.
4. Do not utilize asbestos in fire stop systems.
5. Provide an intumescent fire stop system when exposed to flame or heat.

2.5 BOXES AND CABINETS

A. Outlet Box Requirements:

1. Provide galvanized cast iron boxes for galvanized rigid steel conduit systems.
2. Provide PVC coated boxes and covers in PVC coated conduit systems.
3. Provide corrosion-resistant fiberglass reinforced polyester boxes with stainless steel hardware in severely corrosive areas as defined in Division 16 Section "Basic Electrical Materials and Methods" or as shown.
4. Provide watertight gasketed covers held with nonferrous screws for all cast metal boxes.

B. Junction and Pull Box Requirements:

1. Provide fabricated 10-gauge Type 316 stainless steel for boxes either partially or fully encased in concrete. For partially encased boxes provide sides return channel flanged around cover opening. For fully encased boxes provide flush covers. Provide continuously welded and ground smooth seams. Provide mounting lugs and threaded conduit hubs.
2. Provide watertight gasketed covers held with stainless-steel captive screw slot bolts.
3. Provide steel barriers in all boxes that isolates instrumentation wiring from all other wiring systems
4. Provide all boxes located in severely corrosive areas as defined in Division 16 Section "Basic Electrical Materials and Methods" or as shown, meeting NEMA 4X requirements.
5. Provide all boxes located outdoors or in wet areas meeting NEMA 4X requirements.

2.6 SUPPORTING DEVICES

- A. Raceway Supports: Provide raceway supports meeting Division 16 Section "Support Devices" and the following requirements:
1. Do not use perforated straps or plumbers tape for conduit supports.
 2. Provide expansion bolts or inserts for fasteners in concrete, toggle bolts for hollow masonry or frame construction, and preset inserts for pre-stressed concrete.
 3. Conduit Straps and Backs
 - a. For metallic conduits, provide steel or malleable iron.
 - b. For PVC coated conduits, provide PVC coated malleable iron with stainless steel anchors and bolts.
 4. Conduit Hangers
 - a. For metallic conduits, provide steel adjustable conduit hangers or clevis hangers.
 - b. For PVC coated conduits, provide PVC coated adjustable conduit hangers with stainless steel hardware.
 5. Beam Clamps
 - a. For metallic conduits, provide malleable iron with steel bolt.
 - b. For PVC coated conduit, provide PVC coated malleable iron with stainless steel bolt.
 6. Trapeze Hangers
 - a. For metallic conduits provide 12 gauge 1 1/2-inch square steel channels with steel channel straps to secure conduits.
 - b. For PVC coated conduit, provide either PVC coated 12 gauge 1 1/2-inch square steel channels or 1 5/8-inch square fiberglass channels. Provide PVC coated straps with stainless steel bolts for securing conduits.
 - c. Provide addition channels welded together to limit the deflection to 1/240th of span.
 7. Threaded Rod
 - a. Provide threaded rod with the minimum size as follows:
 - 1) Conduit Hangers

- a) 3/4-inch to 1-1/2-inch conduit: 1/4-inch thread rod
 - b) 2-inch to 3-1/2-inch conduit: 3/8-inch thread rod
 - c) 4-inch and larger: 1/2-inch thread rod
- 2) Trapeze Hangers: Provide threaded rod of sufficient size to support the load. Provide a minimum of 3/8-inch thread rod.
- b. For Metallic Conduit Systems: Provide continuous threaded galvanized steel rod.
 - c. For PVC Coated Conduit Systems: Provide continuous threaded stainless steel rod.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Install electrical equipment and material of the size, type and general routing as shown or required.
- B. Coordination with Reinforcing: Install raceway, fittings, boxes and cabinets free from direct contact with reinforcing steel.
- C. Alignment: Provide fasteners, anchor bolts, anchorage items and supports as required to insure proper and rigid alignment. Attach equipment with fasteners sized according to size and weight of the equipment and the thickness of the supporting surface.
- D. Aluminum Coating: Where aluminum is placed in contact with dissimilar metals, concrete or permanently moist surface, separate contact surfaces with gasket, nonabsorptive tape or coating as specified in Div 9 "Painting", to prevent corrosion.
- E. Grounding: Make metallic raceways electrically and mechanically continuous and ground as required. Install conduits continuous between outlets, boxes, cabinets and panels.

3.2 INSTALLATION

- A. General: Unless otherwise indicated, install conduits exposed, parallel or perpendicular to building floors, ceilings and walls, and to avoid interference with other work. In architecturally finished areas, conceal conduits within finished walls, ceilings and floors. Cut conduits square and deburr the cuts to the same degree as the conduit manufacturer. Fasten conduit securely to outlets, junction, pull and terminal boxes. Provide caps and seals to prevent the entrance of foreign material and moisture during installation and before pulling wire.
 - 1. Where conduit size is not shown, provide conduits one size larger than indicated in Table 4, Chapter 9 of the NEC.
 - 2. Support raceways concealed above suspended ceilings from the slab above in same manner as exposed raceways. Do not support raceways from suspended ceiling supports.

3. Keep conduit at least six inches away from high temperature piping, ducts, flues and surfaces. For mounting on concrete and masonry surfaces provide a minimum of 1/4-inch air space between conduit and mounting surface. Support and fasten conduit to building structural members spaced in accordance with electrical codes. Support conduit at least every eight feet or less in accordance with Electrical Code for the City of New York and NEC requirements.
 4. When two or more exposed conduits are in the same general routing, provide parallel installation with symmetrical bends and for three or more provide trapeze hangers. Size trapeze hangers with space for 25 percent additional conduits.
 5. Make changes in direction with bends or fittings. Use factory-made bends or elbows wherever possible. Make field bends and offsets with a hand bender or conduit-bending machine. Provide a bending radius not less than 36-inches for conduits containing medium voltage cables.
 6. Run conduit in buildings with no more than the equivalent of (three) 90 degree bends between pull points. Provide no more than (125) feet of conduit runs between pull points. Provide pull boxes where shown, specified or wherever required to install conductors and to meet the above requirement.
 7. Install pull and junction boxes in accessible locations with working space in front of and around the installation. Obtain approval to locate boxes in finished areas.
 8. Install an expansion fitting when a conduit crosses a structural expansion joint.
 9. Unless otherwise approved, install conduits to cross at right angles to building structural expansion joints.
 10. Where approved for encased installation, install conduits in slabs as close to the middle of concrete slabs as practicable without disturbing reinforcement. Do not use conduit with an outside diameter exceeding one-third of the slab thickness. Do not place conduits closer than three diameters on centers, except at cabinet locations where the slab thickness is increased.
 11. Pitch conduits to outlet boxes to avoid trapping moisture. Where dips are unavoidable in exposed conduit runs, install drain fitting at low point.
 12. Where raceways travel between areas of significantly different temperature then the raceway shall be sealed to prevent the formation of moisture in the raceway. Examples are raceway from heated to unheated spaces or inside to outside the building.
- B. Conduit Material Types: Provide conduit as follows:
1. Provide rigid steel conduits in all installations concealed in structures, concrete encased within structures or under structures. Also for all corrosive locations, Mechanical, Electrical or Process equipment rooms and all electrical, security or fire alarm feeders.

2. Provide rigid steel conduits for all instrumentation, and electronic equipment signal wiring in all exposed or concealed noncorrosive installations.
3. Provide rigid nonmetallic Schedule 40 conduits underground, concrete encased or direct buried, unless specifically detailed otherwise.
4. Severely Corrosive Locations
 - a. Severely corrosive locations are defined in Division 16 Section "Basic Electrical Materials and Methods" or are as shown.
 - b. Provide PVC coated rigid steel conduit in all installations in severely corrosive locations. Installation, terminations and extensions shall be performed in strict conformance to the manufacturer's instructions - in order to maintain the corrosion resistance of the installation.
5. Underground Conduits: Provide underground conduits meeting the requirements of Division 16 Section "Underground Electrical Distribution System."

C. Connections to Equipment

1. Provide double locknuts and bushing for all boxes, enclosures and cabinets located in dry areas.
2. Provide watertight hub fittings for all boxes, enclosures and cabinets located below grade, in wet flood proof, or in wet, damp or corrosive areas.
3. Provide rigid conduit connection where equipment is fixed and not subject to adjustment, mechanical movement or vibration. Provide union fittings to permit removal of equipment without cutting or breaking conduit.
4. Provide liquidtight flexible conduit connection where equipment is subject to adjustment, mechanical movement or vibration. Maximum length is 18 inches.
5. Coat all threads in steel conduit runs with zinc dust in oil or other corrosion-preventive compound before making connections.

D. Penetrations: Make concealed penetrations for single conduits not more than 1/4-inch larger than the diameter of the conduit. Make penetrations through walls, ceilings and floors other than concrete for exposed conduits not more than 1/4-inch larger than the diameter of the conduit. Fill the voids around conduit with caulking compound and finish the surface the same as the wall, ceiling or floor.

1. Where a conduit enters through a concrete roof or membrane waterproofed wall, floor or ceiling, provide a watertight sealing sleeve that can be tightened from one or both sides. If the sealing sleeve is not placed with the concrete, core drill the proper size hole to provide a mechanically watertight installation.
2. Where a conduit enters through a concrete non-waterproofed wall, floor or ceiling, provide a galvanized steel sleeve, Schedule 40, and fill the space between the conduit and sleeve with a plastic expandable compound. If the sleeve is not placed with the

concrete, drill the hole not less than 1/2-inch nor more than one inch larger than the sleeve, center the sleeve and grout the sleeve for the total depth of penetrated concrete with non-shrink grout, polyurethane or silicone sealant.

- E. Spare Conduit: Provide spare conduits for future use as shown or required. Provide a minimum 200-pound strength nylon pull line in each spare conduit and identify the origin and termination of the conduit at each end. Terminate spare conduits in equipment, boxes or by couplings plugged flush with the inside of building surfaces.
- F. Boxes: Provide boxes of the proper dimensions for the size and quantity of conductors enclosed.
 - 1. For boxes mounted on steel, concrete and masonry surface, provide a minimum 1/4-inch non-metallic spacer to hold the box away from the surface.
 - 2. Provide pressed metal (seamless) boxes in all partition constructed walls.
 - 3. Provide separate support for boxes and bolt units to buildings with expansion anchors, toggle bolts or appropriate screws. For lighting fixture outlet boxes, provide supports adequate to support the weight of the fixture to be mounted on the box.
 - 4. Remove debris including dust, dirt, wire clippings and insulation from the interior of boxes. Replace boxes with open conduit holes. Repair or replace damaged boxes as directed.
 - 5. Unless otherwise indicated, mount outlet boxes flush with the finished wall or ceiling, with the long axis vertical. Unless otherwise shown or specified, provide mounting heights measured from the finished floor to centerline of the outlet box as follows:
 - a. For switches: 3'-2". Mount the box for lighting switches on the strike side of the door.
 - b. For duplex convenience outlets: Finished areas 12 inches and unfinished areas 2 feet.
 - c. For fixtures and equipment: As shown.
 - d. For desk telephone and data outlets: 12 inches.
 - e. For wall telephone and data outlets: 60 inches.

3.3 FIELD PAINTING

- A. Paint conduits meeting the requirements of Division 9 – Painting.

END OF SECTION 16130

SECTION 16132 – UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing underground raceways, electrical cables and grounding. Raceway system consisting of concrete encased conduits, direct buried conduits, manholes, handholes, and outdoor electrical equipment pads shall be provided to meet the requirements of this specification.
- B. Related Sections:
 - 1. Division 2 Section "Earthwork."
 - 2. Division 3 "Concrete Forms and Accessories"
 - 3. Division 3 Section "Cast-In-Place Structural Concrete."
 - 4. Division 3 Section "Concrete Reinforcement"
 - 5. Division 16 Section "Basic Electrical Materials and Methods."
 - 6. Division 16 Section "Grounding."
 - 7. Division 16 Section "Wires and Cables - 600 Volts and Below."
 - 8. Division 16 Section "Electrical Raceway Systems."
 - 9. Division 16 Section "Electric Service."

1.2 SYSTEM DESCRIPTION

- A. Performance Requirements: Route conduits to allow pulling-in of conductors as indicated without exceeding the conductor's tension limits.

1.3 SUBMITTALS

- A. Furnish all submittals, including the following, as specified in General Conditions and Division 16 Section "Basic Electric Materials and Methods."
- B. Product Data and Information: Furnish manufacturer's data for conduits, manholes and handholes and all accessories.
- C. Contractors Shop Drawings: Furnish working drawings for underground electrical raceway system showing conduits, concrete encasement, manholes, handholes, electrical equipment pads and reinforcing. Indicate designation, type, size, location, elevations and slope.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.
- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.

- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

1.5 PROJECT CONDITIONS

- A. Existing Conditions: Examine record drawings to determine the location of all obstructions along the conduit or cable route and at the sites of manholes, handholes and outdoor electrical equipment pads.
- B. Field Measurements: Field survey, and in critical areas, excavate test pits to verify locations of probable obstacles along the conduit or cable route and at the sites of manholes, handholes and outdoor electrical equipment pads.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. Conduit Spacers:
 - a. Carlon Company.
 - b. Underground Devices, Inc.
 - 2. Manhole and Handhole Frames and Covers:
 - a. Neenah Foundry Co.
 - 3. Buried Warning Tape:
 - a. Thomas & Betts
 - b. W. H. Brady Company
 - 4. Manhole Accessories (pulling irons, cable rack and supports, insulators):
 - a. Cooper Power Systems Division.
 - b. A.B. Chance Company.

2.2 MATERIALS

- A. Conduit: Provide conduits meeting the requirements of Division 16 Section "Electrical Raceway Systems."
- B. Cable: Provide cables meeting the requirements of Division 16 Section "Wires and Cables - 600 Volts and Below".
- C. Spacers: Provide rigid plastic, conduit spacers to maintain conduit separation as indicated.

- D. Reinforcing Steel: Provide reinforcing steel meeting the requirements of Division 3 Section "Concrete Reinforcement."
- E. Concrete: Provide concrete meeting the requirements of Division 3 Section "Cast-In-Place Structural Concrete." Dye all concrete used for duct bank encasements "red".
- F. Manhole Frames and Covers: Provide waterproof cast-iron manhole frame and solid bolted cover suitable for H-20 truck load. Cast the word "ELECTRIC" in the cover. Provide frame with a clear opening of 36 inches, unless otherwise shown.
- G. Grounding: Provide grounding meeting the requirements of Division 16 Section "Grounding."
- H. Underground Warning Tape: Provide 6-inch wide detectable type plastic tape in red (electric), yellow (utility) and orange (communications) colors with suitable warning describing the type of buried electrical lines.

2.3 MANHOLE ACCESSORIES

- A. Pulling-in Irons: Provide pulling-in irons constructed of hot-forged, hot-dip galvanized steel.
- B. Cable Racks and Supports: Provide racks and supports constructed of heavy-duty, hot-dip galvanized steel.
- C. Insulators: Provide insulators made of high grade, dry process porcelain with smooth glazed surfaces.

PART 3 - EXECUTION

3.1 CONDUIT INSTALLATION

- A. General: Install underground, concrete encased and direct buried conduits as indicated.
- B. Conduit Route: Establish and mark exactly conduit or cable routing. Resolve routing near existing obstacles and coordinate with other sitework. Maintain a 12-inch minimum longitudinal clearance from the conduit bank encasement or direct buried conduit to adjacent utility lines. Maintain a 6-inch minimum vertical clearance from the conduit bank encasement or direct buried conduit to utility lines at crossovers. Adhere to lines, grades, elevations and dimensions as shown.
- C. Trench Excavation: Perform excavation work in accordance with the requirements of Division 2 Section "Earthwork".
- D. Workmat: Install concrete mat on trench bottom to provide an even base for concrete encased conduit bank in accordance with the requirements of Division 3 Section "Cast-In-Place Structural Concrete."
- E. Bedding: Provide a sand cover on trench bottoms for a firm and smooth surface for direct buried conduits.

- F. Spacers: Locate spacers at intervals of approximately four feet and stagger locations at each conduit tier to provide not less than 12 inches of longitudinal separation.
- G. Conduit: Place conduit in straight lines and with a minimum slope of 0.25 percent (3 inches per 100 feet). Slope conduit down to manholes, handholes and structures. Install expansion fittings in straight runs exceeding 100 feet. Secure conduits in place to prevent floating and movement.
- H. Bends: Install 12-foot minimum radius bends in horizontal turns and vertical deflections. For bends used at ends of conduit runs install elbows with 4-foot minimum radius for 6-inch and 5-inch conduits, and elbows with 3-foot minimum radius for 4-inch and smaller conduits.
- I. Inside Cleaning: Pull a standard flexible mandrel not less than 12-inches long, having a diameter approximately 1/4-inch less than the inside diameter of the conduit, through each conduit, then pull a brush with stiff bristles through each conduit. Replace conduit runs that do not allow the passage of the mandrel at no increase in Contract Price. Use the pneumatic method to draw into conduit the nylon or polypropylene pull line. Plug and seal all conduits after cleaning.
- J. Concrete Reinforcing: Install concrete reinforcing meeting the requirements of Division 3 Section "Cast-In-Place Structural Concrete." Provide duct banks with No. 5 reinforcing, spaced 12 inches on centers, top and bottom, with No. 3 ties at 18 inches, unless otherwise shown.
- K. Concrete Formwork: Install concrete formwork meeting the requirements of Division 3 Section "Concrete Forms and Accessories."
- L. Outside Cleaning: Remove dirt, sand and debris around conduits and from workmat, prior to concrete placement.
- M. Concrete Placement: Place concrete meeting the requirements of Division 3 Section "Cast-In-Place Structural Concrete."
- N. Connections to Structures: Install as shown.
- O. Backfilling: Backfill meeting the requirements of Division 2 Section "Earthwork." Provide a sand cover that is 6 inches over direct buried conduits or cables.
- P. Underground Warning Tape: Install one underground warning tape for each trench up to 18 inches wide. For trenches wider than 18 inches provide two underground warning tapes, one at each edge of the trench. Place the tape or tapes 12 inches below the finished grade.

3.2 MANHOLES AND HANDHOLES

- A. General: Provide cast-in-place reinforced concrete manholes and handholes where shown or required.
- B. Con Edison Manholes: Provide Con Edison electrical service manholes meeting the requirements of Con Edison and Division 16 Section "Electric Service."

- C. Location: Establish and mark manhole and handhole locations exactly. Resolve locations near existing obstacles and coordinate with other sitework. Adhere to orientation, elevations and dimensions as indicated.
- D. Manhole and Handhole Excavation: Install manhole and handhole excavations meeting the requirements of Division 2 Section "Earthwork."
- E. Cast-In-Place Manhole and Handhole Construction: Install cast-in-place manhole construction meeting the requirements of Division 3 Sections "Concrete Forms and Accessories", "Concrete Reinforcement" and "Cast-In-Place Structural Concrete."
- F. Manhole Entrance: Install concrete rings and frame with cover. Adjust position of frame and cover to protrude 1-inch above adjacent unpaved ground or to be flush with the finished surface of pavement.
- G. Backfilling: Backfill meeting the requirements of Division 2 Section "Earthwork".
- H. Accessories: Install pulling-in-irons, cable racks with supports and insulators, grounding system and other items as indicated.

3.3 OUTDOOR ELECTRICAL EQUIPMENT PADS

- A. General: Provide reinforced concrete pads for supporting Outdoor Electrical Equipment as shown.
- B. Location: Establish and mark pad locations exactly. Resolve locations near existing obstacles and coordinate with other sitework under this Contract. Adhere to orientation, elevations and dimensions as shown.
- C. Site Excavation: Provide site excavation meeting the requirements of Division 2 Section "Earthwork."
- D. Pad Construction: Install pad construction meeting the requirements of Division 3 Section "Cast-In-Place Structural Concrete."
- E. Conduit Entrances: Install conduit risers and laterals under pads prior to placement of pads. Separate conduits from pads as shown.
- F. Grounding: Install grounding conductors through pads meeting the requirements of Division 16 Section "Grounding."

END OF SECTION 16132

NO TEXT ON THIS PAGE

SECTION 16140 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing, wiring devices and appurtenances as indicated, in accordance with the Contract Documents.
- B. Related Sections:
 - 1. Division 16 Section "Grounding."
 - 2. Division 16 Section "Electrical Raceway System."

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. Fed Spec WC 596 - Electrical Power Connector, Plug, Receptacle and Cable Outlet
 - 2. Fed Spec WS 896 - Toggle and Lock, Flush Mounted Switches
 - 3. CSA C22.2-182.1 - Industrial-type, Special-Use Attachment Plugs, Receptacles and Connectors
 - 4. UL 20 - General - Use Snap Switches
 - 5. UL 231 - Power Outlets
 - 6. UL 498 - Attachment Plugs and Receptacles
 - 7. UL 508 - Industrial Control Equipment
 - 8. UL 943 - Ground Fault Circuit Interrupters
 - 9. UL 1010 - Receptacle-Plug Combinations for Use in Hazardous (Classified) Locations

1.3 DELIVERY, STORAGE AND HANDLING

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.
- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.

- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

1.4 SPARE PARTS

- A. Furnish the following spare parts.
 - 1. Twenty 20-ampere, 125-volt, 2-pole, 3-wire, grounding type plugs, NEMA 5-20P, nylon housing, Hubbell Cat. No. HBL5366C
 - 2. Ten 20-ampere, 125-volt, 2-pole, 3-wire, grounding type plugs, NEMA 5-20P, corrosion resistant, yellow nylon housing, Hubbell Cat No. HBL 53CM66C
 - 3. Ten percent but not less than 5 matching plugs for each type and rating of receptacles furnished
- B. Package spare parts in containers bearing labels clearly designating contents. Identify all spare parts with information needed for reordering. Deliver spare parts in original factory packages.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Standard of Quality and General Configuration: Use of manufacturer's name and model or catalog number is for the purpose of establishing the desired quality and characteristic.
- B. Configuration and Rating: Provide NEMA specification grade wiring devices in the type, color, configuration and electrical rating for the service indicated.
- C. Symbols: See the electrical symbol list shown for identification of all device types.
- D. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. Hubbell Inc. Wiring Device/Kellems Division
 - 2. Bryant
 - 3. Pass and Seymour

2.2 LIGHTING TOGGLE SWITCHES

- A. Provide toggle switches of specification grade rated 20- amperes, 120-277 volts ac conforming to Fed. Spec. WS 896 and UL Standard 20. Manufacture switches with back and side wired binding screw type terminals, one piece spring contact arm and terminal plate with silver alloy contacts, one piece steel mounting strap with an assured grounding clip, thermoset body color coded for identification by amperage and a brown toggle. Provide ivory toggles in finished areas.

B. Types:

<u>DESCRIPTION</u>	<u>HUBBELL CAT NO.</u>
Single pole	HBL1221
Two pole	HBL1222
Three way	HBL1223
Four way	HBL1224
SPDT center off momentary contact	HBL1557

- C. Accessories: Provide a flush neon "ON" pilot light in conjunction with switches controlling equipment whose operation is not evident at the switch location. Provide an engraved nameplate to identify equipment controlled. Provide a similar pilot light to be illuminated when power is available for switched critical or emergency lights.

2.3 AC MANUAL MOTOR STARTING SWITCHES

- A. Provide ac manual motor starting switches where overload protection is not required or is provided separately. Provide switches similar in construction to the lighting toggle switches except conforming to UL 508 and rated 30-amperes, 120-277 volts ac.

B. Types:

<u>DESCRIPTION</u>	<u>HUBBELL CAT NO.</u>
Single pole	HBL-3031
Double pole	HBL-3032

- C. Accessories: Provide a flush neon "ON" pilot light in conjunction with switches controlling equipment whose operation is not evident at the switch location. Provide an engraved nameplate to identify the equipment being controlled.

2.4 CONVENIENCE RECEPTACLES

- A. Provide specification grade convenience receptacles conforming to Fed. Spec. WC 596 UL listed, with nylon impact resistant face, one piece metal wrap around mounting strap with assured grounding clip, back and side wired binding screw type terminals, brass power contacts and a heavy duty heat stabilized thermoset plastic base. Provide brown devices in unfinished areas and ivory devices in finished areas unless otherwise specified.

B. Types:

<u>DESCRIPTION</u>	<u>RATING</u>	<u>COLOR</u>	<u>HUBBELL CAT NO.</u>
Single	NEMA 5-20R 20A, 125V, 2P, 3W	Brown/	HBL5361/
		Ivory	HBL53611
Duplex	NEMA 5-20R 20A, 125V, 2P, 3W	Brown/	HBL5362/
		Ivory	HBL5362I
Single corrosion- resistant	NEMA 5-20R 20A, 125V, 2P, 3W	Yellow	HBL53CM61

<u>DESCRIPTION</u>	<u>RATING</u>	<u>COLOR</u>	<u>HUBBELL CAT NO.</u>
Duplex corrosion- resistant	NEMA 5-20R 20A, 125V, 2P, 3W	Yellow	HBL53CM62
Single	NEMA 6-20R 20A, 250V, 2P, 3W	Brown/ Ivory	HBL5461/ HBL5461I
Duplex	NEMA 6-20R 20A, 250V, 2P, 3W	Brown/ Ivory	HBL 5462/ HBL5462I
Quadrplex	NEMA 5-20R 20A, 125V, 2P, 3W	Brown/ Ivory	HBL420H/ HBL420HI

2.5 SPECIAL USE RECEPTACLES

- A. Provide special use receptacles of specification grade in accordance with applicable Fed. Specs, UL, ANSI and CSA Standards.
- B. Type:

<u>DESCRIPTION</u>	<u>RATING</u>	<u>COLOR</u>	<u>HUBBELL CAT NO.</u>
Duplex-ground fault circuit interrupter	NEMA 5-20R 20A, 125V, 2P, 3W	Brown/ Ivory	GF5352L/ GF5352IL

2.6 OUTLET BOXES

- A. Provide outlet boxes in accordance with the requirements specified in Division 16 Section "Electrical Raceway Systems."

2.7 PLATES AND COVERS

- A. Provide covers and plates for the various areas as follows:
 - 1. Areas Below Grade, Corrosive, and Wet Areas
 - a. For switches provide weatherproof, gasketed, covers with external operating handle.
 - b. For receptacles in wet or outdoor areas provide a weatherproof, gasketed, clear, flame-retardant, jumbo, polycarbonate cover a minimum of 5.4 inches deep, suitable for use with a 10-3 cord that allows the cover to be closed even when the receptacle is in use.
 - c. In below grade and Wet Areas provide devices with weatherproof caps or covers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install all wiring devices in accordance with manufacturer's recommendations and approved shop drawings.
- B. Toggle Switches: Install toggle switches applicable for the area environment for switching lighting or other branch circuit loads.
- C. Receptacles: Install receptacles applicable for the area environment.
- D. Grounding: Ground all devices in accordance with the requirements specified in Division 16 Section "Grounding."

END OF SECTION 16140

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SECTION 16210 – ELECTRIC SERVICE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnish and install electric service system including property line box, conduits, cables, meter base and accessories as required for a complete installation in accordance with the Contract drawings and Con Edison requirements.
- B. Related Sections
 - 1. Division 16 Section "Wires and Cables."
 - 2. Division 16 Section "Electric Raceway Systems."
 - 3. Division 16 Section "Underground Electrical Construction."
 - 4. ConEdison – Service drawings and related specifications (not included in this Specification).

1.2 SUBMITTALS

- A. Correspondence: Furnish copies of all correspondence with the Con Edison including available short circuit currents and X/R ratings for each feeder.
- B. Calculation of arc-flash hazard classification, prepared in accordance with IEEE 1584 and NFPA-70E for the following pieces of electrical equipment:
 - 1. Main service equipment (Power Panel)
 - 2. Lighting panel
 - 3. Motor control panel
 - 4. Lighting contactor panel
 - 5. Safety switches at pump motors and fans
 - 6. Control panels for pumps for rain water and Calcium Chloride
- C. Con Edison Drawings: Furnish Con Edison prepared drawings.
- D. Manufacturer's catalog data sheets for all products

1.3 SYSTEM DESCRIPTION

- A. Service for the facility shall consist of one 200 ampere feed rated 208/120 Volt, three-phase, four-wire. The feed will be derived from the Con Edison network service in Canal Street. The service feeds shall extend from the Con Edison POS to the metering equipment located at the building. Con Edison shall extend service feeders from the street manholes to the POS termination at the Property Line box, located directly inside the property line at the Canal Street driveway entrance to the property. Con Ed will make the connections to the contractor-supplied conductor at the property line box. From there the contractor shall extend them to the metering equipment and distribution panel mounted on the building. Refer to Con Edison standard drawing #EO-6210-B.

- B. Contractor shall extend concrete encased raceways per contract drawings from the building to the contractor-installed property line box to meet the Utility raceways.

1.4 QUALITY ASSURANCE

- A. Contact the appropriate Con Edison representative for specific instructions regarding electric service requirements at this facility before commencing work.
- B. Completed installation must receive Con Edison approval.

1.5 PRODUCT DELIVERY, HANDLING, AND STORAGE

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.
- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.
- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.
- D. Receive, handle, store (if necessary) and install all equipment furnished by Con Edison for this installation as described in the Con Edison drawings and notes and as stated hereinafter. Equipment in the contractor's possession will be their responsibility for safety and security as well as any damage.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide all equipment and material not furnished by Con Edison that is needed to complete the electrical service work shown. Also install all equipment required for the service furnished but not installed by Con Edison. All equipment and material shall conform to Con Edison "Requirements for Electric Service Installations" and all pertinent Con Edison specifications and standards.

2.2 CON ED METERING

- A. Revenue Meters will be furnished by Con Edison.
- B. Provide meter base located on wall in accordance with the requirements of Con Edison.

2.3 CON ED REQUIRMENTS

- A. All equipment and material shall conform to Con Edison "Requirements for Electric Service Installations" and all pertinent Con Edison specifications.
- B. Certain equipment will be furnished by Con Edison for installation by this contractor.

2.4 UTILITY METERING STRUCTURES

- A. Provide service metering structure/enclosure in the designated space.
- B. The structure/enclosure shall contain incoming service interface, metering, and protective devices as required by Con Edison.
- C. The structure/enclosure shall conform to Con Edison requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Con Edison Arrangements: The Contractor shall make arrangements with Con Edison to obtain permanent electric service to the Project, remove existing service (if necessary) and pay for any charges approved by the City Of New York, associated with the service procurement.
- B. Contractor shall also make all arrangements with Con Edison to receive and store equipment provided by Con Edison for this project.
- C. Coordination: Coordinate schedule of Con Edison facilities with all other work.
- D. Con Edison System Information: Obtain all information required to determine interrupting capacities for service equipment including available fault current and X/R ratio at the point of service.
- E. Calculate arc flash hazard classification for electrical equipment and label per NFPA-70E and IEEE-1584. See Section 1.2 B. above.

3.2 INSTALLATION

- A. Con Edison point of service (POS) is located at the property line box. The underground duct connecting to the network service manhole in the street will be provided by the Utility. The cable connection to the Con Edison System from the POS and the connection in the property line box shall be by Con Edison.
- B. Install all equipment, cabling and accessories for the Con Edison equipment at the new meter location by the Main Distribution Panel in accordance with Con Edison requirements and the Contract drawings.
- C. Utility metering structures including metering shall be located in the electrical niche on the exterior of the building wall. Meters shall be furnished by Con Edison and will be mounted

adjacent to the service equipment in the electrical niche. Extend raceway and wiring between the utility metering equipment and the service entrance equipment. Make connections as required at each location.

END OF SECTION 16210

SECTION 16220 – ELECTRIC MOTORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for electric motors as specified.
- B. Related Sections:
 - 1. Division 16 Section “Basic Electrical Materials and Methods.”
 - 2. Division 16 Section “Grounding.”
 - 3. Division 16 Section “Electrical Identification.”
 - 4. Division 16 Section “Electrical Raceway Systems.”

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AFBMA 10 - Metal Balls.
 - 2. NEMA CP1 - Shunt Capacitors.
 - 3. NEMA MG1 - Motors and Generators.
 - 4. NEC - National Electrical Code.
 - 5. NYCBC - New York City Building Code.
 - 6. NYSEC – New York State Energy Code.
 - 7. EAct 2007 – Energy Policy Act 2007.

1.3 SUBMITTALS

- A. General: Furnish all submittals, including the following, as specified in General Conditions and Division 16 Section “Basic Electrical Materials and Methods.”
- B. Product Data and Information: No electric motors are being provided under Division 16. Submit electric motor driven assemblies under applicable Divisions providing those assemblies.
- C. Shop Drawings: No electric motors are being provided under Division 16. Submit electric motor driven assemblies under applicable Divisions providing those assemblies.
- D. Operations and Maintenance Manuals: Furnish operation and maintenance manuals for all electric motor driven equipment as specified in General Conditions.

1.4 QUALITY ASSURANCE

- A. Codes: Comply with local codes and all other applicable codes.
- B. Regulatory Requirements: Comply with requirements of the Regulatory Agencies having jurisdiction over this Project.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.
- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.
- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. General Electric Company
 - 2. Magnetek
 - 3. Reliance Electric
 - 4. Siemens
 - 5. Baldor
 - 6. U.S. Electrical Motors
 - 7. TECO/Westinghouse Corp.

2.2 MATERIALS

- A. General: Provide motors and accessories with the equipment as specified under the equipment sections.
- B. Motor Requirements: Unless otherwise specified, provide motors as follows:
 - 1. Polyphase motors of the high energy efficiency and high power factor type.
 - 2. Motor nameplate horsepower as specified for the driven equipment.
 - 3. Motors that operate continuously over the entire load range of the driven equipment without loading motor in excess of nameplate rating and its specified temperature limit.
 - 4. For motors rated $\frac{1}{2}$ hp and greater, operating at 208 volts, 3-phase, 60-hertz, provide squirrel cage induction type.
 - 5. For motors less than $\frac{1}{2}$ hp, provide 115-volt, single phase, 60-hertz type.

6. Motor's that are suitable for continuous operation with a line voltage variation within ± 10 -percent of rated voltage.
7. Motors that operate continuously in a 40 degrees C ambient.
8. Inverter duty motors when powered from an adjustable frequency drive.

C. Frequent Start Requirements: Provide motors for frequent starting as specified.

2.3 MECHANICAL PROTECTION

A. Indoor Locations:

1. For motors located in dry, clean and well ventilated areas provide open drip-proof type.
2. For motors located below grade and in Dry Flood Proof areas, provide totally-enclosed, fan-cooled type with removable drain plug.
3. For motors located in wet, damp or dusty areas, provide totally-enclosed, fan-cooled type with removable drain plug.
4. In corrosive and severely corrosive areas as defined in Division 16 Section "Basic Electrical Materials and Methods" or as shown, provide totally-enclosed, fan-cooled Mill and Chemical Duty type with removable drain plug.
5. In hazardous areas provide Totally Enclosed Fan Cooled explosion proof motors rated for application in the area classification.
6. In Wet Flood Proof areas provide motors approved for use in those area classifications.

B. Outdoor Locations: For motors located outdoors, provide a totally-enclosed, fan-cooled type with removable drain plug.

C. Submersible Locations: For operation in a hazardous location, provide a completely sealed submersible motor.

2.4 BOXES

A. Provide oversized conduit boxes on motors to facilitate conductor installation and auxiliary components as required.

1. Make conduit box NEMA enclosure ratings compatible with motor enclosures.

2.5 NEMA DESIGN AND INSULATION

A. Design Classification: Provide NEMA Design B, unless otherwise specified with NEMA Class F moisture resistant insulation and NEMA Class B, 80 degrees C temperature rise at rated nameplate load.

- B. Variable Speed Operation: Provide insulation to protect against adverse affects of a non-sinusoidal waveform (voltage and harmonic heating).

2.6 WINDINGS

- A. Provide copper windings and rotor bars, unless otherwise specified.

2.7 BEARINGS

- A. Ball and Roller Bearings: Use antifriction ball or roller type bearings at manufacturer's option, unless otherwise specified.
- B. Regreasable Bearings: Use regreasable bearings with support side thrust loadings, with an AFBMA B-10 bearing life rated at least 100,000 hours, based on a reliability of 90 percent.

2.8 SERVICE FACTOR AND LOADINGS

- A. Service Factor: Provide 1.15 service factor for sinusoidal voltage waveforms and 1.0 for non-sinusoidal voltage waveforms unless otherwise specified. Where motors with a 1.0 service factor are furnished for non inverter duty, provide motors rated at least 15 percent greater than required brake horsepower.
- B. Shaft Loading: Provide steady state shaft loading not to exceed 100 percent of full load rating under maximum load, excluding the service factor, unless otherwise specified.

2.9 SPEED

- A. General: Provide motor speed as specified for the driven equipment.
- B. Multispeed: Provide multispeed motors as specified for the driven equipment.
- C. Adjustable Speed: Provide motors specifically designed and rated for use with the adjustable speed device furnished.

2.10 TORQUE

- A. General: Provide breakdown torque of 200 percent or more of motor full load torque.
- B. Locked Rotor: Provide locked rotor torque of 80 percent or more of motor full load torque.
- C. Inertia: Provide necessary WK2 data for special loads to coordinate with motors.
- D. Special Motors: Supply special motors where torque requirements exceed standard design.

2.11 SLIDE RAILS AND SOLE PLATES

- A. Provide slide rails and sole plates as required for proper installation.

2.12 SINGLE PHASE FRACTIONAL HORSEPOWER MOTORS

- A. Provide capacitor or open split phase start, for smaller than 1/2 hp motors unless otherwise specified.

2.13 THREE-PHASE MOTORS

- A. Induction Motors: Provide horizontal or vertical squirrel cage induction motors for continuous duty with full voltage starting except as otherwise specified.

2.14 EFFICIENCY

- A. Provide motor meeting the requirements as stated in EPC Act 2007 for General Purpose Electric Motors, Subtype I and II. See NEMA MG-1 Table of Full Load Efficiency of Premium Energy Efficient Motors. Refer to Tables 12.12 (Subtype I) and Table 12.11 (Subtype II).

2.15 POWER FACTOR

- A. Provide motors having the following minimum power factor ratings:

Motor Power Factor - Minimum		
Percent		
<u>Horsepower</u>	<u>At 1800 RPM Power Factor</u>	<u>At 1200 RPM Power Factor</u>
1	74.3	69.7
1-1/2	76.5	62.0
2	70.3	70.1
3	79.9	73.7
5	83.8	75.8
7-1/2	82.4	78.2
10	85.0	76.4
15	85.0	81.1
20	84.6	81.9
25	84.5	82.0
30	84.2	82.5
40	84.2	83.3
50	85.0	84.9
60	86.8	85.7
75	86.6	86.0

2.16 NOISE

- A. Limit motor machine noise to sound power levels listed in NEMA MG 1-9.

2.17 ACCESSORIES

- A. Identification: Provide identification meeting the requirements with Division 16 Section "Electrical Identification."
- B. Space Heaters: Where specified or shown, provide motor space heaters to prevent moisture condensation when the motor is not operating. Provide space heaters suitable for 115-volt, single phase, 60-hertz operation.

- C. Thermal Detectors: Where specified, shown or required, provide motor winding temperature switches or thermal devices. Constant speed motors 50 HP to 200 HP (except fire pump application) and variable speed motors over 30 HP shall be equipped with thermistor type winding thermal protection.

2.18 SOURCE QUALITY CONTROL

- A. Shop Tests: Perform actual job motor shop tests for motors over 200 hp. Include standard commercial and additional tests listed below, and special tests listed in other sections.
- B. Standard Commercial Tests: Perform the following tests in accordance with NEMA standards.
 - 1. No load running current and speed.
 - 2. Locked rotor current.
 - 3. Dielectric routine tests.
 - 4. Motor efficiency tests.
 - 5. Motor power factor tests.
- C. Additional Testing: Perform the following additional tests in accordance with NEMA standards.
 - 1. Winding resistance.
 - 2. Bearing inspection.
 - 3. Power factor at full, 3/4 and 1/2 load.
 - 4. Efficiency at full, 3/4 and 1/2 load.
 - 5. Motor starting torque.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install motors in accordance with the manufacturer's recommendations and approved shop drawings. Make all necessary adjustments to equipment to provide a complete operational system.

3.2 FIELD QUALITY CONTROL

- A. Inspections and Tests: Perform field preliminary and final inspection and testing for motors as specified in General Conditions and as follows:
 - 1. Preliminary Inspection:
 - a. Demonstrate that each motor has been properly connected and aligned with the load.
 - b. Check for proper rotation by bumping prior to connecting motor to driven equipment.

2. Final Test:

- a. Measure motor applied voltage and current with equipment operating at full load.
- b. Operate equipment as specified.

3.3 CLEANING AND PAINTING

- A. Field Painting: Clean and touch up marred surfaces to match the original finish.

END OF SECTION 16220

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SECTION 16411 - DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing and installing enclosed fused safety switches for use as feeder and branch circuit switching and disconnect devices for motors and equipment.
- B. Related Sections
 - 1. Division 9 Section "Painting."
 - 2. Division 16 Section "Basic Electrical Materials and Methods."

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. NEC - National Electrical Code.
 - 2. NYCEC - Electrical Code for the City of New York.
 - 3. NEMA KS1 - Enclosed Switches.
 - 4. UL 248-8 - Class J Current Limiting Fuses.
 - 5. UL 486A - Wire Connectors and Soldering Lugs for Use With Copper Conductors.

1.3 SUBMITTALS

- A. General: Furnish all submittals, including the following, as specified in General Conditions and Division 16 Section "Basic Electrical Materials and Methods."
- B. Product Data and Information: Furnish manufacturer's data indicating disconnect switch ratings and dimensions. Furnish manufacturer's data on fuses including time-current curves.

1.4 QUALITY ASSURANCE

- A. Codes: Provide disconnect switches meeting the requirements of NFPA, the Electrical Code for the City of New York, National Electrical Code and local codes.
- B. Regulatory Requirements: Provide all disconnect switches designed, manufactured and tested in accordance with latest ANSI, IEEE and NEMA Standards, and UL listed.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Shipping and Packing: Provide materials and equipment suitably boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. Clearly label such boxes, crates or enclosures with manufacturer's name, and name of material or equipment enclosed.

- B. Repair or replace all materials and equipment damaged by handling and storage as directed at no additional Contract cost.
- C. Storage and Protection: Protect materials and equipment from exposure to the elements and keep them dry at all times. Handle and store to prevent damage and deterioration in accordance with manufacturer's recommendations.

1.6 SPARE PARTS

- A. Furnish the following spare parts:
 - 1. Twelve of each size and type fuse installed.
- B. Packaging: Plainly tag and mark spare parts for identification and for reordering and properly box and wrap spare parts to prevent deterioration. Completely identify the box on the outside.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are as listed below. Other manufacturers of equivalent products may be submitted for approval.
 - 1. Disconnect Switches:
 - a. General Electric
 - b. Cutler Hammer
 - c. Killark
 - d. Square D Company
 - 2. Fuses:
 - a. Bussmann
 - b. Littelfuse
 - c. Ferraz Shawmut

2.2 DISCONNECT SWITCHES

- A. General: Provide disconnect switches of the NEMA KS-1, heavy-duty, load-interrupter, enclosed-knife switch type with externally operating handle interlocked to prevent opening of the front cover with the switch in the ON position. Provide an interlock that is defeatable and operable from the front of the switch. Provide handle lockable in the OFF position. Where specified on drawings or required by code furnish switch with handle lockable in the "on position".
- B. Disconnect Switch Ratings: Provide disconnect switches rated for 250-volts as applicable and horsepower rated when used in motor circuits. Current ratings are as indicated.

- C. Service Entrance: Where shown, provide disconnect switches suitable for service entrance.
- D. Fusible Switches: Furnish switches with rejection feature to allow only Class J current limiting fuses to be installed.
- E. Disconnect Switch Housings: Provide disconnect switches housed in NEMA rated enclosures as follows:

AREA	ENCLOSURE
Outdoor and below 100 year flood grade elevation indoors	NEMA 4X – Watertight and corrosion-resistant stainless steel with stainless steel external hardware. Provide all external operators made of the same materials as that of the enclosures
Corrosive areas as defined in Division 16 Section “Basic Electrical Materials and Methods” or as shown	NEMA 4X - Watertight and corrosion-resistant stainless steel with stainless steel external hardware. Provide all external operators made of the same materials as that of the enclosures
Severely corrosive areas as defined in Div 16 Section “Basic Electrical Materials and Methods” or as shown.	NEMA 4X – Non metal heavy duty enclosures with watertite PVC coated steel raceway fittings and ground conductor terminals.
Above grade indoor	NEMA 12 – Industrial

2.3 FUSES

- A. Characteristics: Provide UL 248-8 listed Class J current limiting fuse with a minimum interrupting rating of 100,000 rms symmetrical amperes.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install disconnect switches as shown or required. Comply with requirements of the Electrical Code for the City of New York, NEC and local electrical codes.
- B. Coordination: Coordinate with other work including cabling and wiring work.
- C. Torque Requirements: Tighten electrical connectors and terminal including screws and bolts, in accordance with equipment manufacturers', published torque tightening recommendations. Where manufacturers' torque requirements are not available, tighten connectors and terminals in accordance with UL Standard 486A.
- D. Fuse: In each disconnect switch install the proper type and size fuse for the load served.

- E. Labels: Provide adhesive label on inside of door of each fusible disconnect switch indicating type and size of fuse for replacement. Provide adhesive label on outside of cover for all disconnect switches that serve as motor disconnects to say "Except in emergency situations, operate control lockout or unit controller to turn off power before opening this switch"

END OF SECTION 16411

SECTION 16443 - PANELBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements for providing lighting/ appliance, power and distribution panelboards including circuit breakers, fuses and cabinets.
- B. Related Specifications
 - 1. Division 16 Section "Basic Electrical Materials and Methods."
 - 2. Division 16 Section "Electrical Identification."
 - 3. Division 16 Section "Lighting Control System"

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. NEMA PB 1 - Panelboards
 - 2. UL 67 - Panelboards
 - 3. Fed. Spec.W-P-115c - Power Distribution Panel
 - 4. UL 486A - Wire Connectors and Soldering Lugs for Use with Copper Conductors
 - 5. ASCE 24-05 - Flood Resistant Design and Construction.
 - 6. NEC - National Electrical Code
 - 7. NYCCC - New York City Construction Code

1.3 SUBMITTALS

- A. General: Furnish all submittals, including the following, as specified in General Conditions and Division 16 Section "Basic Electrical Materials and Methods."
- B. Product Data and Information: Furnish the manufacturer's catalog data for panelboards, circuit breakers, metering and accessories.
- C. Operations and Maintenance Manuals: Furnish operation and maintenance manuals for the panelboards as specified in General Conditions.

1.4 QUALITY ASSURANCE

- A. Codes: Provide all materials and workmanship meeting the requirements of the NEMA, UL, NFPA, NYCCC, National Electrical Code and local codes.

1. Design, fabricate and test the panelboards in accordance with applicable ANSI, IEEE and NEMA standards.
2. Provide panelboards suitable for operation at their standard nameplate ratings in accordance with ANSI standards.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in General Conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
 1. General Electric Company
 2. Square D Company
 3. Cutler Hammer

2.2 MATERIALS

- A. General: Provide factory-assembled fully rated dead-front type, panelboards, suitable for surface or flush mounting with branch circuit breakers and a main circuit breaker or main lugs as indicated. Panelboard assemblies shall be seismic qualified. Mains shall be vertical, top mounted and separate from the branch breaker assembly.
- B. Provide panelboards with a full capacity separate ground bus and when connected to a three-phase four-wire or a single-phase three-wire service, with insulated neutral buses as indicated. The total number of overcurrent protective devices shall be limited to 42 single pole connections or the equivalent multi-pole load.
 1. Provide panelboards with the voltage, frequency and current ratings as indicated conforming to NEMA Standard PB 1, Fed. Spec. W-P-115, UL 67 and the NYCCC, NEC.
 2. Provide panelboards with copper main, neutral and ground buses.
 3. Provide sequence phase connection of all branch circuits to the main bus.
 4. Where required, provide panelboards suitable for use as service entrance equipment.
 5. All distribution panels shall have a Surge Protection Device (SPD) integrated in the enclosure.
- C. Bracing: Provide main bus bracing exceeding the short circuit available at the panel bus and the lowest interrupting rating of any circuit breaker installed.

- D. Fabrication: Fabricate panelboards using galvanized steel, continuously welded to provide a NEMA 12 enclosure. Provide cabinet fronts with doors over the circuit breakers. Provide doors fastened with concealed hinges and equipped with vault handle type catches. Provide constructions suitable for wet flood proofing in areas so designated.
1. Provide panelboards at least 20 inches wide, 5 3/4 inches deep, with full wiring gutters on all sides. Gutters shall be a minimum of 4" and not less than required to contain all the cables required to be run therein. This includes feeders that transit through them.
 2. Provide all panelboard trim exceeding five square feet in area with an inside permanently secured angle to support the trim during fastening.
 3. Panelboards shall be suitable for industrial service and for the environment where they are located.
 4. Panelboards located in severely corrosive areas shall be Hot Dipped Galvanized (HDG) after fabrication or otherwise suitably protected from corrosion and the environment. If HDG they shall be finished with 2 coats of zinc rich paint.

2.3 CIRCUIT BREAKERS

- A. Provide bolt-on heavy duty industrial type branch and main circuit Full-size 1" breakers shall be supplied for single pole applications. No miniature circuit breakers shall be supplied on this contract.
- B. Furnish the frame sizes, trip settings and number of poles as indicated. Mark ampere trip rating on the circuit breakers in a clear and visible manner.
1. For lighting and appliance panelboards (LP and RLP), provide 20-ampere, single-pole, 120 or 277 volt circuit breakers unless otherwise shown or scheduled, suitable for switching use with HID and fluorescent lighting loads.
 2. For power panelboards (PP), provide 20-ampere, three-pole, 600-volt circuit breaker, unless otherwise shown or scheduled.
 3. For distribution panelboards (DP), provide 100-ampere, three-pole, 600-volt circuit breaker, unless otherwise shown or scheduled.
- C. Provide all breakers with quick-make, quick-break, toggle mechanisms with automatic thermal-magnetic, inverse time-limit overload and instantaneous short circuit protection on all poles, unless otherwise indicated. Indicate automatic tripping by the breaker handle assuming a clearly distinctive position from the manual ON and OFF position. Design the breaker handle to be trip-free on overloads.
- D. Interrupting Rating: Provide circuit breakers with symmetrical short circuit interrupting ratings not less than the available short circuit as determined by a Utility Short Circuit Availability request to Con Edison. Provide multipole breakers that utilize a common tripping bar.

- E. Provide ground fault interrupter circuit breakers for all circuits serving receptacles located, below grade and outdoors and as scheduled. Also provide them for branch circuits in wet flood proofed areas.
- F. Provide full (1") module size single-pole breakers. Do not install two-pole breakers in a single-pole module.
- G. Where main breakers are supplied they shall be vertically mounted.
- H. Provide lugs sized for the cable to be connected.

2.4 ACCESSORIES

- A. Directories: Provide directories in accordance with Division 16 Section "Electrical Identification."
- B. Circuit Breaker Handle Lock: Where shown provide circuit breakers with handle clamp that holds the circuit breaker handle in the ON position.
- C. Keying: Panel locks to be per DSNY standard. Cylinder type Yale #511-S with #47 keys or equal - confirm requirement with the Commissioner.

2.5 Surge Protection Device (SPD):

1. Provide surge protection device (SPD) equipment that complies with UL 1449 and UL 1283 in all distribution panels (DP).
2. Provide units with a maximum continuous operating voltage that exceeds 115 percent of the nominal system operating voltage.
3. Provide SPD equipment suitable for wye-configured systems.
4. Provide SPD equipment having directly connected suppression elements between line-neutral (L-N), line-ground (L-G), and neutral-ground (N-G).
5. Provide SPD equipment that distributes the surge current to all MOV components to ensure equal stressing and maximum performance and provides equal impedance paths to each matched MOV.
6. Wire internal components with connections utilizing low impedance conductors and compression fittings.
7. Provide each SPD for distribution panel application with a minimum total surge current capable of withstanding 150kA per phase.
8. Provide properly sized molded case circuit breaker disconnect for each SPD unit. Connections from the main bus to the SPD unit shall be of minimum length of copper bus or twisted cables.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install all panelboards in accordance with manufacturer's recommendations and approved shop drawings and as specified in Division 1 and in compliance with the requirements of NEMA standards, NYCCC, NEC, applicable ANSI Publications and ASCE 24-05.
- B. Mounting Height: Mount all panelboards either surface or flush mounted as shown such that the height of the top operating handle does not exceed 6 feet 6 inches from the floor.
- C. Coordination: Coordinate with other Work including cabling and wiring work to interface the installation of the panelboards. Leave adequate space around panel to accommodate the lighting controls and control cabinets. Torque Requirements: Tighten electrical connectors and terminals, including screws and bolts, in accordance with the equipment manufacturer's published torque tightening values for the equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals in accordance with UL 486A.
- D. Circuit Breaker Handle Lock: Install circuit breaker handle clamp on each circuit breaker where shown.
- E. Directory: Provide a laminated typewritten directory with the following information:
 - 1. Circuit number
 - 2. Area served
 - 3. Utilizing equipment
- F. SPD: Mount unit inside the distribution panelboard enclosure.

3.2 PAINTING

- A. Field Painting: Touch up scratched and marred surfaces to match the original finish

END OF SECTION 16443

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SECTION 16491 - CONTROL COMPONENTS AND DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements for providing manual starters, motor controllers, group motor controllers and remote control stations. In addition, the requirements for control components and devices for use in equipment provided under various other sections.
- B. Related Sections:
 - 1. Division 16 Section "Basic Electrical Materials and Methods."
 - 2. Division 16 Section "Requirements for Shop-Assembled Equipment."
 - 3. Division 16 Section "Grounding."
 - 4. Division 16 Section "Electrical Identification."
 - 5. Division 16 Section "Wires and Cables - 600 Volts and Below."

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. NEMA ICS 2 - Industrial Control Devices, Controllers and Assemblies
 - 2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)
 - 3. UL 486A - Wire Connectors and Soldering Lugs for Use With Copper Conductors
 - 4. UL E69852 - Group Motor Control

1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Provide equipment capable of operating in an ambient temperature range of 0 to 40 degrees C and humidity of up to 90 percent non-condensing.
- B. Motor Controllers: Provide motor controllers suitable for 208-volt, three-phase, three-wire, 60-hertz operation.
- C. Control Devices: Provide control devices suitable for operation at 120-volts, 60-hertz, unless specifically noted otherwise.
- D. Insulation Class: Provide control equipment and devices that meet the requirements of the 600-volt insulation class.

1.4 SUBMITTALS

- A. Furnish all submittals, including the following, as specified in General Conditions and Division 16 Section "Basic Electrical Materials and Methods."

- B. Product Data and Information: Furnish catalog data for all associated equipment and devices.
 - C. Shop Drawings: Furnish shop drawings customized to the project for manual starters, motor controllers, group motor controllers and remote control stations that include the following:
 - 1. Outline drawings showing dimensions, identification of components and a nameplate schedule for all units.
 - 2. Bill of materials including manufacturers' name and catalog number.
 - 3. Individual schematic and wiring diagrams for each motor controller
 - D. Equipment Ratings: Obtain and enter full performance details on all motors and other equipment being served on the above drawings.
 - E. Furnish operation and maintenance instructions as specified in General Conditions.
- 1.5 QUALITY ASSURANCE
- A. Codes: Provide manual starters, motor controllers, group motor controllers and remote control stations that are in accordance with NEMA ICS 2.
 - 1. Provide manual starters, motor controllers and remote control stations that are in accordance with the Electrical Code for the City of New York, NEC and local codes.
 - B. UL Listing: Provide UL-listed manual starters, motor controllers, group motor controllers and remote control stations.
- 1.6 DELIVERY, STORAGE AND HANDLING
- A. Storage and Protection: Store all equipment and materials in a dry, covered, heated and ventilated location. Provide additional measures in accordance with manufacturer's instructions.
- 1.7 SPARE PARTS
- A. Furnish the following spare parts:
 - 1. Two control stations of each type provided.
 - 2. One of each type of manual starter provided.
 - 3. One of each type of motor controllers provided.
 - B. Packaging: Pack spare parts in containers bearing labels clearly designating contents and related pieces of equipment. Deliver spare parts in original factory packages. Identify all spare parts with information needed for reordering.

PRODUCTS

1.8 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.
1. Manual Starters, Motor Controllers and Remote Control Stations:
 - a. Cutler-Hammer.
 - b. General Electric Company.
 - c. Square D Company.
 2. Control Relays:
 - a. Cutler-Hammer.
 - b. Square D Company.
 - c. General Electric Company
 3. Timing Relays:
 - a. Agastat 7000 Series.
 - b. Eagle Signal.
 4. Reset and Repeat Cycle Timers:
 - a. Eagle Signal.
 - b. Automatic Timing and Controls.
 5. Current Switches:
 - a. Cutler- Hammer ECS.
 - b. Hawkeye 708/908.
 6. Alternators:
 - a. Time Mark Corp. Model 261.
 - b. ABB SSAC Inc. Series ABP.

1.9 MANUAL MOTOR STARTERS

- A. Provide toggle-type, thermal-switch, manual motor starters with pilot lights for all 120-volt, single-phase motors rated less than $\frac{1}{2}$ hp.
- B. Where shown or required, provide starters complete with a HAND/OFF/AUTO selector switch.
- C. Provide starter enclosures as specified under the article "Remote Control Stations."

1.10 MOTOR CONTROLLERS

- A. General: Provide 208-volt, 3-phase, 60-hertz, across-the-line, combination motor circuit protector magnetic starters with individual control power transformers.
- B. Magnetic Starters: Provide magnetic starters as follows:
 - 1. Full voltage non-reversing or full voltage reversing, as required.
 - 2. Starter contacts of the replaceable, spring-loaded, wedge type with silver-cadmium oxide plated contact surfaces.
 - 3. Provide replaceable coils of the epoxy sealed type.
 - 4. Thermal Overload Elements: Class 20 thermal overload element and all required accessories. Provide size five and larger starters with current transformer operated overload relays.
 - a. Bimetallic type with an adjustment knob which allow plus or minus 15-percent adjustment of the heater's nominal rating.
 - b. Size the overload relays after approval of the corresponding motor.
 - c. Provide and adjust overload relays that match the associated motor nameplate running-current rating.
 - d. Provide a set of isolated, normally-open and normally-closed contacts for each overload relay.
- C. Motor Circuit Protectors: Provide a motor circuit protector for each combination starter as follows:
 - 1. Molded-case, air-break type designed for 600-volt, 60-hertz service with an interrupting capacity of 100,000 rms symmetrical amperes at 480 volts.
 - 2. Three-pole motor circuit protectors with magnetic, adjustable-trip units actuating a common tripping bar to open all poles when an overload or short circuit occurs.
 - 3. No thermal elements.
 - 4. Magnetic trip units capable of being set from 700 to 1,300 percent of the motor full-load amperes.
- D. Control Components: Provide push buttons, switches, indicating lights, transformers, relays and timers as specified under the Article "Control Components."
- E. Enclosures: Provide motor controllers installed in NEMA 250 rated enclosures as follows:

ITEM	ENCLOSURE
Outdoor, wet flood proofed and below grade elevation indoors	NEMA 4X – Watertight

ITEM	ENCLOSURE
Corrosive areas as defined in Section 16050 – Basic Electrical Materials and Methods or as shown	NEMA 4X – Watertight and corrosion-resistant stainless steel with stainless steel external hardware. Provide all external operators made of the same materials as that of the enclosures.
Severely Corrosive Areas as defined in Section 16050-Basic materials and Methods or as shown.	Watertight and corrosion-resistant non-metallic enclosure. Reinforced molded fiberglass with suitable external operators

1.11 REMOTE CONTROL STATIONS

- A. General: Provide heavy-duty, oiltight remote control stations, consisting of push buttons, indicating lights, and selector switches with double-break silver contacts meeting the requirements specified under the section Control Components. Enclosures: Provide remote control stations installed in NEMA 250 rated enclosures as follows:

ITEM	ENCLOSURE
Outdoor, wet flood proofed and below grade elevation indoors	NEMA 4 – Watertight
Corrosive areas as defined in Section 16050 – Basic Electrical Materials and Methods or as shown	NEMA 4X – Watertight and corrosion-resistant stainless steel with stainless steel external hardware. Provide all external operators made of the same materials as that of the enclosures.
Severely Corrosive Areas as defined in Section 16050-Basic materials and Methods or as shown.	Watertight and corrosion-resistant non-metallic enclosure. Reinforced molded fiberglass with suitable external operators.

1.12 CONTROL COMPONENTS

- A. Push Buttons, Selector Switches and Indicating Lights:
1. Provide heavy-duty, oiltight, 30.5 mm, push-button or selector-switch control stations arranged for flush-panel mounting.
 2. Provide the additional switches, relays, and other electrical accessories necessary to control and safeguard the operation of the associated equipment.
 3. Provide 30.5 mm, low-voltage, push-to-test, LED type indicating lights suitable for operation at 120-volt, 60-hertz ac control circuit voltages.
 4. Color code indicating lights as follows:
 - a. Red - Motor running

- b. Green - Motor off
 - c. Amber - Capable of operation from this point
 - d. Blue - Alarm or trouble condition
- B. Control Power Transformer: Provide an individual, control power transformer for each starter to derive the 120 volts for the unit's control circuit. Provide transformers with sufficient capacity to meet the energy demands for all related control components including relays, solenoids and other indicated items. Provide dual fuses on the primary and one fuse on the secondary. Ground the unfused leg of the secondary to the enclosure.
 - C. Elapsed Time Meters: Provide nonreset-type elapsed time meters to register up to 9999.9 hours, having square cases suitable for panel mounting and having coils for 120-volt, 60-hertz operation.
 - D. Control and Latching Relays: Provide control and latching relays of 600-volt class, machine-tool quality with convertible contacts. Provide relay-operating contacts rated at a minimum of 10 amperes, 120 volts, 60 hertz.
 - E. Timing Relays: Provide four-pole, double-throw, timing relays with timing ranges and ON/DELAY or OFF/DELAY operation as required. Provide contacts rated a minimum of 10 amperes at 120 volts, 60 hertz.
 - F. Reset and Repeat Cycle Timers: Provide electromechanical or solid-state type reset and repeat cycle timers, with timing ranges and functions as indicated. Provide contacts rated at a minimum of 10 amperes, 120 volts, 60 hertz. Solid-state output contacts are not acceptable.

PART 2 - EXECUTION

2.1 INSTALLATION

- A. General: Install all equipment in accordance with the manufacturer's recommendations and approved shop drawings.
- B. Mounting: Mount manual starters, motor controllers and remote control stations 4 feet 6 inches from the finished floor up to their centerlines, unless otherwise shown. Mount all devices at least ½ inch away from concrete wall surfaces. Mount the current switches in a terminal box enclosure near the motor to be monitored. Extend wiring from the contacts back to the MCC for distribution.
- C. Adjustments: Set all motor circuit protectors and circuit breakers based on the approved short circuit and coordination study. Set the current switches per the recommendations of the motor supplier.
- D. Overloads: Adjust the thermal overloads on each phase of each starter unit for the actual motor installed.
- E. Cable Connections: Terminate and label all field wiring per the approved diagrams.

- F. Torque Requirements: Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturers' published torque tightening recommendations. Where manufacturers' torque requirements are not available, tighten connectors and terminals in accordance with UL Standard 486 A.

2.2 FIELD QUALITY CONTROL

- A. Inspect, adjust and check the installation for physical alignment, cable terminations and ventilation.

END OF SECTION 16491

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SECTION 16500 – LIGHTING EQUIPMENT LAMPS AND BALLASTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Contract Documents: Drawings and General and Special provisions of the Contract, including bidding requirements, General Conditions, and General Requirements of the Specifications apply to work of this section.

1.2 DESCRIPTION

- A. General: Extent of interior and exterior lighting fixture work is indicated on drawings and schedules, by requirements of this Section, and Section: "Electrical Basic Requirements."
- B. This section below includes the following:
 - 1. Interior lighting fixtures, lamps, and ballasts.
 - 2. Emergency lighting units.
 - 3. Exit signs.
 - 4. Lighting fixture supports.
 - 5. Retrofit kits for fluorescent lighting fixtures.
- C. Related Sections include the following:
 - 1. Lighting Controls [Division 13] - manual or programmable control systems with low-voltage control wiring or data communication circuits.
 - 2. Lighting Control Systems [Division 16 – Section 16600]
 - 3. Lighting Control Devices [Division 16] - for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multi-pole lighting relays and contactors.
 - 4. Basic Electrical Materials and Methods.
 - 5. Electrical Identification
 - 6. Wires and Cables
 - 7. Emergency Lighting System
 - 8. Wiring Devices
 - 9. Underground Ducts & Manholes
- D. Types: Types of interior/exterior lighting fixtures, lamps and ballasts in this Section shall include the following:
 - 1. Fluorescent
 - 2. Compact Fluorescent
 - 3. High-Intensity-Discharge (HID)
 - 4. LEDs

- E. Other Divisions: Refer to other divisions of the specification for the following:
1. Division 3: Cast-in-place Structural Concrete
 2. Division 5: Structural Steel
 3. Division 5: Metal Fabrications

1.3 DEFINITIONS

- A. BF: Ballast factor.
- B. CRI: Color-rendering index.
- C. CU: Coefficient of utilization.
- D. HID: High-intensity discharge.
- E. LER: Luminaire efficacy rating.
- F. Luminaire: Complete lighting fixture, including ballast housing if provided.
- G. RCR: Room cavity ratio.

1.4 REFERENCES

ANSI	American National Standards Institute
ANSI C 2	National Electrical Safety Code
ANSI C 78.379	Electric lamps – incandescent and HID lamps
ANSI C 78.1300	Specifications for high pressure sodium lamp series
ANSI C 82.1	Ballasts for fluorescent lamps specifications
ANSI C 82.11	Ballasts for fluorescent lamps specifications (electronic)
ANSI C 82.4	Ballasts for high-intensity discharge [multiple supply type] and low pressure sodium lamps.
AASHTO	American Association of State and Highway Transportation Officials
ASTM	American Society for Testing and Materials
ASTM B 429	Standard Specification for extruded steel structural pipe and tube.
IESNA	Illuminating Engineering Society of North America
NEMA	National Equipment Manufacturers Association
NEMA WD6	Wiring devices – Dimensional requirements
NEMA LE4	Recessed luminaires: ceiling compatibility
NEMA FA 1	Outdoor floodlighting equipment
NEMA OD 3	Physical and electrical interchangeability of photo control devices and mating receptacles
NEMA SH 5	Tubular steel poles
NFPA	National Fire Protection Association
NFPA 70	National Electric Code

NFPA 101	Life Safety Code
Administrative Code	
NYCEC	NYC Electrical Code
NYCBC	NYC Building Code
ECCCNYS	Energy Conservation Construction Code of NYS (2007)
LL 86	Local Law 86 [LEED Silver]
UL	Underwriters Laboratories
UL 57	Electric Lighting Fixtures
IL 844	Electric Lighting Fixtures for use in hazardous (classified) locations.
UL 924	Emergency Lighting and Power Equipment
UL 935	Fluorescent Lamp Ballasts
UL 1029	High-Intensity Discharge Lamp Ballasts
UL 1570	Fluorescent Lighting Fixtures
UL 1571	Incandescent Lighting Fixtures
UL 1572	High Intensity Discharge Lighting Fixtures
OSHA	Occupation Safety and Health Administration

The Energy Policy Act of 1992: Lamp Efficiency Labeling and Standards

The Energy Policy Act of 2005: Lamp Efficiency Labeling and Standards

1.5 SUBMITTALS

- A. Conform to the requirements of the "General Conditions."
- B. Product Data: Submit manufacturer's data on lighting fixtures, lamps and ballasts.
- C. Shop Drawings: Submit dimensioned drawings of lighting fixtures. Submit fixture shop drawings assembled in order of luminaire "Type" designation with proposed fixture and accessories clearly indicated on each sheet. Shop drawings may be submitted for review

before fabrication. Fabrication details may vary slightly from those shown on drawings provided those changes do not adversely affect ease of installation, durability, performance, or appearance of fixture.

- D. **Manuals:** Prior to final inspection, provide complete set of operating and maintenance manuals. Include technical data sheets and parts ordering information. Include testing and maintenance requirements and instructions for emergency lighting equipment.
- E. Shop drawings of all special or modified standard lighting equipment shall be submitted in reproducible form. Fixture fabrication details shall be drawn at either full size or half size scale. Fixture fabrication details shall illustrate a minimum of three (3) critical views indicating all fabrication, and assembly methods, materials, material gauges and finishes to be employed.
- F. Submittals or shop drawings lacking sufficient detail to indicate clear and complete compliance with contract documents shall be rejected.
- G. "Approved Equal" specification status does not and shall not exempt the identified manufacturers from full and complete compliance with all criteria identified in the specifications with regards to photometric performance, brightness control, size, finishes, credentials or experience, etc. Consideration, acceptance or rejection of any proposed submittal at any time shall rest solely upon the evaluation of the Commissioner for those areas within the project scope.
- H. **Product Data:** Submit manufacturer's data including the following:
 - 1. Dimensioned and detailed drawings assembled in luminaire "type" alphabetical order [G, N and X series] and showing: materials of construction, arrangements of components and wiring, gasketing for weather tightness, means of mounting luminaire and adjusting aspect, finishes, electrical data including volts, amperes and watts.
 - 2. Lamp ANSI designation, initial and mean lumen output, average rated hours of lamp life and lamp mortality curve, color temperature and color rendering index.
 - 3. Ballast UL listing, volts, lamp and line amperes, input watts and minimum lamp starting temperature.
 - 4. Shop drawings shall be submitted along with clear indications of mounting conditions and mounting details as may be required or necessary for the proper installation of fixture.
- I. **Photometric Data:** If requested supply complete photometric data for each fixture, photometric reports shall be rendered by an independent testing laboratory developed according to methods of the Illuminating Engineering Society (IESNA) of North America as follows:
 - 1. Luminaire description and dimensions, including ballast factor for fluorescent fixtures.

2. Candela distribution data, presented graphically and numerically in no more than 5 degree increments (5, 10, 15, etc.). Data developed for up and down quadrants normal, parallel and at 22.5, 45, 167.5 degrees to fixture axis if light output is asymmetric.
 3. Zonal lumens stated numerically in 10 degree increments (5, 15, etc.) and fixture efficiency.
 4. Luminance table with data presented numerically, showing maximum luminance of the fixture at the shielding angles. Readings should be taken both crosswise and lengthwise in the case of fluorescent fixtures or fixtures with asymmetric distribution.
 5. Coefficients of utilization table.
- J. Air and Thermal Performance Data: For air-handling lighting fixtures. Furnish data required in "Submittals" Article in Division 15 Section "Diffusers, Registers, and Grilles."
- K. Sound Performance Data: For air-handling lighting fixtures. Indicate sound power level and sound transmission class in test reports certified according to standards specified in Division 15 Section "Diffusers, Registers, and Grilles."
- L. Wiring Diagrams: Power Wiring
- M. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Lighting fixtures.
 2. Suspended ceiling components.
 3. Structural members to which suspension systems for lighting fixtures will be attached.
 4. Other items in finished ceiling including the following:
 - a. Air outlets and inlets.
 - b. Speakers.
 - c. Sprinklers.
 - d. Smoke and fire detectors.
 - e. Occupancy sensors.
 - f. Access panels.
 5. Perimeter moldings.
- N. Samples for Verification: Refer to Section 16500/ 1.12 & 1.13
1. Lamps: Specified units installed.
 2. Accessories: Cords and plugs.
- O. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

- P. Qualification Data: For agencies providing photometric data for lighting fixtures.
- Q. Field quality-control test reports.
- R. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A. All lighting fixtures shall be manufactured, furnished, and installed in compliance with all government agencies having jurisdiction. All fixtures shall bear the appropriate UL (or ETL) and IBEW identifications.
- B. Manufacturers: Provide products of firms regularly engaged in the manufacture of interior and exterior lighting equipment of the types and ratings whose products have been in satisfactory use in similar service for not less than 3 years.
- C. National Electrical Manufacturers Association (NEMA): Comply with applicable requirements of NEMA LE 4, "Recessed Luminaires, Ceiling Compatibility" pertaining to recessed luminaires.
- D. National Fire Protection Association (NFPA): Comply with NFPA 70, "National Electrical Code," as applicable to construction and installation of interior building lighting fixtures and emergency lighting.
- E. Underwriters Laboratories, Inc. (UL): Comply with applicable UL standards pertaining to interior and exterior lighting equipment [see 1.3].
- F. Materials and equipment, as well as workmanship shall conform to the highest commercial standards and shall be as specified and/or as indicated on the drawings. Parts not specifically identified shall be made of materials most appropriate for their intended use.
- G. Manufacturers: manufacturers listed as approved equal in Appendix #1 Fixture Schedule shall be assumed capable of supplying the listed fixtures unless clearly written exceptions are set forth in their quotations. Any such exceptions shall immediately be brought to the attention of the Commissioner. Manufacturers not listed (approved equal) must comply with the following:
 - 1. Experience: Manufacturers shall have not less than three years experience in design and manufacturing of lighting fixtures of the type and quality shown. Submission must include a list of completed projects and dated catalogue pages or drawings indicating length of experience.
 - 2. Samples: Manufacturers shall submit a prototype sample of each fixture for review by the Commissioner. Prototype samples shall be sufficiently detailed and operational to allow evaluation of compliance with the salient features of the specification. Preliminary design or shop drawings shall not be accepted in place of prototype samples (see Section 1.8).
- H. Product Data: Submit manufacturer's data as described in 1.5.H.

- I. Photometric Data: If requested supply complete photometric data for each fixture, photometric reports shall be rendered by an independent testing laboratory (NRTL compliant as defined by OSHA in 29 CFR 1910.7) developed according to methods of the Illuminating Engineering Society (IESNA) of North America and NVLAP as described in 1.5/I
- J. 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.
- K. FMG Compliance: Lighting fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FMG.
- L. Mockups: Provide interior lighting fixtures for room or module mockups, complete with power and control connections.
 - 1. Obtain Commissioner's approval of fixtures for mockups before starting installations.
 - 2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approved fixtures in mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 - 4. Refer to 1.13 mockups

1.7 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction elements that penetrate ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Lighting fixtures shall be wrapped for protection during delivery, storage, and handling. Wet or damp wrapping shall be removed, and disposed of, to prevent staining finish.
- B. Deliver materials in manufacturer's original, unopened, protective packaging.
- C. Store materials in original packaging in a manner to prevent soiling and physical damage, prior to installation.
- D. Handle in a manner to prevent damage to finished surfaces.
- E. Where possible, maintain protective covering until installation is complete and remove such coverings as part of final cleanup.

1.9 WARRANTY

- A. All ballasts shall carry a minimum five (5) year warranty from date of luminaire acceptance. (see Ballasts).
- B. All lighting fixtures (unless noted otherwise) and accessories shall carry a minimum one year (1) warranty after final written acceptance by the City of New York.

1.10 TECHNICAL AND ADMINISTRATIVE REQUIREMENTS

- A. All information identified in the following Schedules, Details, Layouts and Specifications [Section 16500: Parts 1, 2 & 3] shall be considered to form a complete and integrated Specification for Lighting Fixtures and Control Systems in the agreed upon Scope Areas. The Contractor shall be responsible for contacting the Commissioner regarding the proper interpretation of all information indicated on the Lighting Fixture Schedules, Fixture Cuts, Details and Specifications.
- B. The submission of a proposal by the Contractor will be construed as evidence that a careful, complete and thorough examination of the premises, existing job conditions and Contract Documents has been made and later claims for labor, materials or equipment required or for difficulties encountered, which could have been foreseen had such an examination been made, will not be recognized. It shall also constitute a representation that the Contractor has checked and verified all quantities, work and materials involved and shall take complete responsibility for any deficiencies encountered thereafter.
- C. The Contractor shall be solely responsible for verifying all fixture quantities, lengths and clearances required and shall inform the Commissioner of job conditions at variance with fixtures as specified or detailed which affect installation or location.
- D. The Contractor shall insure that the lighting fixture manufacturer shall keep on file and make available for review by the Commissioner and the City of New York complete Quality Control and Quality Assurance records for all phases of production for all lighting fixtures to be supplied under this project.
- E. The Contractor shall be solely responsible for coordinating and expediting the timely procurement and delivery for all lighting equipment, lamps, ballasts and related components for the project.
- F. Specifications and 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. Minor details not usually indicated on the drawings nor specified, but that are necessary or normally required for the proper execution, completion, installation and operation of the fixtures, shall be included, the same as if they were herein specified or indicated on the drawings.
- G. 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 normally required in the production of the lighting fixtures. The full and complete responsibility for accurately purchasing, fabricating and installing the lighting fixtures described herein to the fulfillment of those specifications including compliance with all regulatory bodies (i.e.: UL) shall rest solely with the Contractor.

1.11 SPARES

As part of this contract, the Contractor shall furnish the following:

- A. Lamps: 1 for each 10 [10%] of each type and rating installed. Furnish at least 12 of each type.
- B. Louvers/Lenses: 1 for each 20 [5%] of each type and rating installed. Furnish at least 5 of each type.
- C. Ballasts: 1 for each 20 [5%] of each type and rating installed. Furnish at least 5 of each type.
- D. Globes and Guards: 1 for each 10 [10%] of each type and rating installed. Furnish at least 5 of each type.

1.12 SAMPLES

- A. Upon request, the contractor shall submit for review one representative sample for each or any lighting fixture required under this Contract. After sample acceptance, the fixture shall be sent to the project for use as a standard. In the event the submission is rejected, the fixture will be returned to the manufacturer who shall immediately make a new submission which meets the contract requirements.
- B. Shipping: The samples must be actual working unit of fixtures to be supplied and shall be submitted complete with specified lamp(s), 120 volt ballast/transformer complete with cord and plug set and ready for hanging, energizing and examining sample shall be shipped (prepaid) by Contractor to the Commissioner or as otherwise specified or directed.

1.13 MOCKUPS

- A. The specific design requirements of several building conditions will mandate the necessity of full scale on site mockups prior to final authorization (release) to fabricate. The Contractor shall include as part of his bid provision for complete on site mockups of the following conditions:

TYPE	LOCATION	MAGNITUDE (extent)
S1	Salt Storage	2 fixtures
SX1	Exterior Facade	2 fixtures

1.14 INDUSTRY STANDARDS

A. Applicability of Standards:

Except where more explicit or stringent requirements are written into the Contract Documents, applicable construction industry standards have the same force and effect as if found in or copied directly into the Contract Documents. Such industry standards are made a part of the Contract Documents by reference.

1. Referenced standards (standards referenced directly in the contract documents) take precedence over standards that are not referenced but generally recognized in the industry for applicability to the work.
2. Unreferenced standards are not directly applicable to the work, except as a general requirement of whether the work complies with recognized construction industry standards.

B. Publication Dates:

Except as otherwise indicated, where compliance with an industry standard is required, comply with the latest standard in effect as of date of Contract Documents.

C. Conflicting Requirements:

Where compliance with two or more standards or criteria is specified, and where these standards establish different or conflicting requirements for minimum quantities or performance quality levels, the most stringent requirement will be enforced, and henceforth provided by the Contractor unless the Contract Documents or the specifically indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent, to the Commissioner for a decision before proceeding.

D. Minimum Quantities or Quality Levels:

In every instance the quantity or quality level shown or specified is intended to be the minimum to be provided or performed. Unless otherwise indicated, the actual work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. In complying with these requirements, the indicated numeric values are minimum or maximum values, as noted or as appropriate for the context of the requirements. Refer instances of uncertainty to the Commissioner for a decision before proceeding.

E. Copies of Standards:

The Contract Documents require that each entity performing work be experienced in that part of the work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the work. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed for proper performance of the work the Contractor is required to obtain such copies directly from the publication source.

2. Although copies of standards needed for enforcement of requirements may be required submittals, the Commissioner reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

F. Abbreviations and Names:

Trade association names and titles of general standards are frequently abbreviated. The following acronyms of abbreviations, as referenced in Contract Documents, are defined to mean the association names. Both names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up-to-date, as of the date of Contract Documents:

AASHTO	American Association of State Highway And Transportation Officials 444 North Capitol St., Suite 4249 Washington, DC 20001	phone (202) 624-5800
ACIL	American Council of Independent Laboratories 1629 K St., NW, Suite 400 Washington, DC 20006 www.acil.org info.acil.org	phone (202) 887-5872 fax (202) 887-0021
ANSI	American National Standards Committee 25 W 43 rd Street, 4 th Floor New York, NY 10036 www.ansi.org info@ansi.org	phone (212) 354-3300 fax (212) 398-0023
ASTM	American Society for Testing and Materials 100Barr Harbor Drive PO Box C700 West Conshohocken, PA 19428 www.astm.org service@astm.org	phone (610) 832-9585 fax (610) 832-9555
AWS	American Welding Society 550 NW Jeune Road Miami, FL 33135 www.aws.org info@aws.org	phone (305) 443-9353 fax (305) 443-7555
ETL	Electrical Testing Laboratories, Inc. 3933 US Route 11 Industrial Park Cortland, NY 13045 www.intertek-etlsemko.com janna.gutchess@intertek.com	phone (607) 753-6711 fax (607) 756-9891

- ICEA Insulated Cable Engineers Association Inc.
P.O. Box 1568
Carrolton, GA 30112
www.icea.net
- IFI Industrial Fasteners Institute
1505 E. Ohio Bldg.
Cleveland, OH 44114 phone (216) 241-1482
- IESNA Illuminating Engineering Society of North America
120 Wall Street, 17th Floor
New York, NY 10005-4001 phone (212) 248-5000
www.iesna.org fax (212) 248-5017/18
iesna@iesna.org
- IEEE Institute of Electrical and Electronic Engineers
3 Park Avenue, 17th Floor
New York, NY 10016 phone (212) 419-7900
www.ieee.org fax (212) 752-4929
webmaster@ieee.org
- NEC National Electric Code (see NFPA)
- NECA National Electrical Contractors Association
7315 Wisconsin Ave
Bethesda, MD 20814 phone (301) 657-3110
- NEMA National Electrical Manufacturer's Association
1300 N. 17th St., Suite 1847
Rosslyn, VA 22209 phone (703) 841-3200
www.nema.org fax (703) 841-5900
gmoniznema@verizon.net
- NETA International Electrical Testing Association
221 Red Rocks Vista Drive
Morrison, CO 80465 phone (303) 467-0526
- NFPA National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169 phone (617) 770-3000
www.nfpa.org fax (617) 770-0700
publicfire@nfpa.org
- UL Underwriters Laboratories
333 Pfingten Rd.
Northbrook, IL 60062 phone (847) 272-8800
www.ul.com fax (847) 272-8129
CustomerExperienceCenter@us.ul.com

G. Federal Government Agencies:

Names and titles of federal government standard or specification producing agencies are frequently abbreviated. The following acronyms or abbreviations as may be referenced in the Contract Documents indicate names of standard specification producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up-to-date as of the date of the Contract documents.

CFR	Code of Federal Regulations Available from the Government Printing Office N. Capitol St. between G and H St., NW Washington, DC 20402	phone (202) 783-3238
CPSC	Consumer Product Safety Commission 5401 Westbard Ave. Bethesda, MD 208169	phone (800) 638-2772
CS	Commercial Standard (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	phone (202) 377-2000
DOT	Department of Transportation 400 Seventh St., SW Washington, DC 20590	phone (202) 366-4000
EPA	Environmental Protection Agency 401 M St., SW Washington, DC 20460	phone (202) 382-2090
NBS	National Bureau of Standards (U.S. Department of Commerce)	
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) Government Printing Office Washington, DC 20402	phone (202) 523-6091
PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	phone (202) 783-3238

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
- B. In Interior Lighting Fixture Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selection:
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the manufacturers specified.
 - 2. **Basis-of-Design Product:** The design for each lighting fixture is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 GENERAL

- A. Lighting fixtures shall be of rigid construction, dimensionally stable, and shall be assembled with secure fastenings. Ferrous parts shall be protected from corrosion by plating or shall be finished with high reflectance enamel with non-yellowing binder and high pigment to binder ratio, with semi-gloss finish. Ferrous parts shall be prepared for finish by industry standard finishing process (see Finishes). Non ferrous metals (i.e. aluminum) unless otherwise noted be treated with a semi-gloss polyester powder coat enamel finish.
- B. Provide each fixture with lamps as indicated in the lighting fixture schedule. Where/or if lamps are not indicated, contact the Commissioner for clarification.
- C. Hinged door closure frames shall operate smoothly without binding. Where possible fabricate frames to allow lamp installation/removal without tools. Hinge mechanism shall be designed to preclude accidental falling of hinged door closure frames during relamping operations and while secured in operating position.
- D. Recessed, surface or pendant lighting fixtures shall be suspended from structural members or ceiling structure members of minimum 1-1/2" channels, by standard bar hangers, or other approved means. Fixture locations shall be coordinated with ceiling patterns. Refer to architectural reflected ceiling plan for exact location of fixtures and architectural rooms finish schedule for ceiling construction details and mounting heights. The installing contractor shall provide all structural steel and related supports as required or necessary to properly and safely install and support the fixtures.
- E. Fixture wiring shall be suitable for the temperature rating of the fixture; wiring through fluorescent channels shall be done with Type SFF2 wire. Where a junction box is required, to change from branch circuit to fixture wiring, use approved feed through, pre-wired fixture wiring, and install a separate junction box. The junction box shall be fully accessible after installation of covering materials. Where flexible conduit or portable cord is used, a grounding jumper shall be installed. All fixtures shall be grounded. Housings shall be so constructed that all electrical components are easily accessible and replaceable without removing fixtures from their mountings, or disassembling adjacent construction.

- F. All recessed, pendant and surface mounted lighting fixtures unless otherwise noted or directed shall be UL listed for through-wiring and shall be furnished complete with all required integral wiring and all required flexible conditions, pigtails and related accessories necessary for suitable operation and installation.
- G. All recessed fixtures, which are to be installed in insulated ceilings, shall be provided with UL listed thermocouple protection.
- H. 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 written acceptance of the work by the City of New York.
- I. Enclosures: Fabricate fixture enclosures with a minimum No. 20 gauge (0.0359 inch) thick cold rolled sheet steel. Enclosures may be constructed of other metals, provided they are equivalent in mechanical strength, durability and in compliance with local codes and acceptable for the purpose.
- J. 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.
- K. Castings: All aluminum, iron or composite castings shall be exact replicas of the approved patterns and shall be free of sand pits, blemishes, scales and rust, and shall be smoothly furnished. Tolerance shall be provided for any shrinkage of the metal castings in order that the finished castings will accurately fit in their designated locations. Unless otherwise noted for cast aluminum components use copper free 319 or 443 aluminum alloy only. For cast iron components use ASTM Spec A48-83 Class 30 gray iron.
- L. Mounting frames and rings: If ceiling system requires, each 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.
- M. Yokes, brackets and supplementary supporting members needed to mount lighting fixtures to carrier channels, suitable ceiling members or other structure shall be furnished and installed by the Contractor.
- N. For steel and aluminum fixtures all screws, bolts, nuts and other fastening and latching hardware shall be cadmium or equivalent plated. For stainless steel fixtures, all hardware shall be stainless steel. Whenever possible all fasteners shall be captive type. Where indicated provide tamper resistant fasteners.
- O. Welding shall be in accordance with recommendations of the American Welding Society and shall be done with electrodes and/or methods recommended by the manufacturers of the metals being welded. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth.

All welds on or behind surfaces which will be exposed to view shall be done so that finished surfaces will be free of imperfections such as pits, runs, splatter, cracks, warping, dimpling, depressions or other forms of distortion or discoloration. All welded surfaces shall be free of weld splatter and welding oxides.

- P. Extruded aluminum frame and trim shall be rigid and manufactured from 6063-T3 aluminum alloy without blemish or warpage in the installed product. Miter cuts shall be accurate. Joints shall be flush and without burrs. Cuts shall maintain alignment with the light fixture located in its final position.
- Q. All extruded aluminum fixtures shall be fabricated of 6063-T3 alloy (min. wall thickness .120) and in all cases shall be provided with heavy gauge internal alignment brackets in order to assure tight joints and a clean level and continuous appearance after installation. Unless otherwise noted, all end plates shall be continuously welded, filled and ground prior to application of final paint finishes so as to present a clean, seamless and monolithic appearance. Exposed fasteners on end plates shall be absolutely prohibited.
- R. All fixtures with removable louvers, lenses, reflectors, refractors, cones or other shielding devices shall be supplied with integral safety chains. Contractor shall be responsible for insuring that all safety chains are securely fastened to shielding device and fixture housing.
- S. Air-Handling Fluorescent Fixtures: For use with plenum ceiling for air return and heat extraction and for attaching an air-diffuser-boot assembly specified in Division 15 Section "Diffusers, Registers, and Grilles."
 - 1. Air Supply Units: Slots in one or both side trims join with air-diffuser-boot assemblies.
 - 2. Heat Removal Units: Air path leads through lamp cavity.
 - 3. Combination Heat Removal and Air Supply Unit: Heat is removed through lamp cavity at both ends of the fixture door with air supply same as for air supply units.
 - 4. Dampers: Operable from outside fixture for control of return-air volume.
 - 5. Static Fixture: Air supply slots are blanked off, and fixture appearance matches active units.

2.3 FLUORESCENT LIGHTING FIXTURES

- A. General: Conform to UL 1570, except for damp and wet locations conform to UL 57.
- B. General construction and materials: Housing end plates, socket bridges, reflectors, wiring channels and ballast covers shall be die formed of not less than No. 20 gauge (0.0359 inch thick) cold rolled steel unless specified otherwise. Construct fixtures so that ballast may be serviced or replaced without removal of fixture housing.
- C. Lampholders shall be heavy white thermoset urea plastic with definite locking-in feature and silver-plated contacts for proper lamp operation and life. Outdoor lampholders shall be neoprene gasketed and compression type. Sockets with open circuit voltage over 300 volts shall be safety type and designed to open supply circuit on lamp removal. All fluorescent lamp holders shall be UL listed devices.

- D. Mount lamps on series rapid-start circuits within one inch of grounded metal, minimum one inch wide, as long as lamp.
- E. Electromagnetic Interference Filters: Provide electromagnetic interference filters in fluorescent fixtures where indicated. Filters shall be integral to the fixture assembly, one filter per ballast and shall suppress electromagnetic interference as required by MIL-STD-461, "Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference."

2.4 FLUORESCENT BALLASTS

- A. Ballasts shall be UL listed, type 1 outdoor and CSA certified where applicable. Ballasts shall be high power factor types, designed to operate on the voltage system to which they are connected. Ballasts shall be Class P with sound rating "A" unless otherwise noted. Fixtures and ballasts shall be designed and constructed to limit the ballast case temperature to 75° C (152° F) when installed in an ambient temperature of 40° C (96° F).
 - 1. Ballasts shall be designed for input voltage of circuits to which they are connected. Submit for each type of fixture used in the project certification that each type of fixture has been tested, equipped and mounted as it is to be finally installed and found to operate satisfactorily and as specified. Maintain the conditions required by the manufacturer for proper operation throughout the construction period. The permanent installation shall conform to the drawings and specifications and the conditions required by the fixture manufacturer for proper operation of ballast, fixture and lamp.
- B. Solid-State Electronic Ballasts for T8 and T5 lamps:
 - 1. Provide energy efficient, solid-state electronic ballasts. The ballasts shall be designed to operate at an input frequency of 60 Hz and shall invert the low frequency to a high frequency (20 kHz) and apply this to the lamps which shall operate without visible flicker. Ballast shall be designed to exclusively operate specify lamp type and quantity, [i.e., one-32 watt T-8 rapid start lamp]. Rapid start ballasts shall maintain lamp filament heating after the lamps are started to assure optimum lamp life.
 - a. All 265 mA T-8 electronic ballasts shall be rapid start types [only].
 - b. All 270 mA T-5 (40w "biax") electronic ballasts shall be series program rapid-start types [only]. Instant start shall be permitted provided the ballast contains auto-reset end-of-life protection circuitry to prevent lamp end-of-life socket overheat condition.
 - c. Ballast shall be high frequency (20 kHz or greater) and operate without visually detectable flicker (stroboscopic effect).
 - d. Ballasts shall have high power factor/minimum 95 percent, UL listed for Class P, sound rated A, Type I outdoor.

- e. Electronic ballast shall have a lamp current crest factor of no more than 1.7.
- f. Harmonic Distortion: Ballast shall not generate total harmonics (THD) in excess of 10%. Upon request, tests shall be submitted demonstrating performance using specified number and type of lamps.
- g. Ballasts shall be fully or particularly potted for heat disposition.
- h. Ballast Factor: Electronic ballast operation shall insure that lamp lumen output is no less than the value listed below of lamp manufacturer's printed lumen output utilizing standardized core and coil ballasts.

One 25w T8	0.91	Two 25w T8	0.89
One 32w T8	0.87	Two 32w T8	0.87
One 54w T5	1.00	Two 54w T5	1.00
- i. Ballasts shall contain no PCBs.
- j. Efficacy: Ballast shall meet minimum efficacy standards of Public Law No. 100-357 (1988): 2-F40T12, 1-F40T12, 2-F96T12+ HO.
- k. Ballast shall be short circuit protected.
- l. Line Transient Protection: Ballast shall be designed to withstand line transients as defined in ANSI C62.41-1991 Cat. A1.
- m. Electromagnetic and RF Interference: Ballast shall comply with Part 18 of the FCC Federal Commission Rules and Regulations, Subpart C for Non-Consumer Equipment.
- n. Ballast case operating temperature shall not exceed 35°C (56° F) temperature rise.
- o. Ballast shall have a 3-year written warranty from date of installation, against mechanical or electrical defects under normal conditions of use. Warranty shall include free replacement for warranty period.
- p. Electronic ballast manufacturer shall certify to have been manufacturing ballasts for no less than three years prior to submission of data and shall submit evidence of successful past installations of similar scale and scope.
- q. Upon request the Contractor shall submit for review by the Commissioner definitive independent laboratory (ETL or other) "bench" test data regarding performance of ballasts.
- r. Reduced-current and hybrid electronic/magnetic ballasts are not acceptable.

2. **Low Temperature Ballasts:**
Where indicated, provide fluorescent ballasts having a minimum starting temperature of minus 20° C (0° F) in fixtures located where average ambient temperature may fall below 11° C (50° F).
3. **Ballasts for Bi-Level Controlled Lighting Fixtures: Electronic type.**
 - a. **Operating Modes:** Ballast circuit and leads provide for remote control of the light output of the associated lamp between high- and low-level and off.
 - 1) **High-Level Operation:** 100 percent of rated lamp lumens.
 - 2) **Low-Level Operation:** 50 percent of rated lamp lumens.
 - b. Ballast shall provide equal current to each lamp in each operating mode.
 - c. **Compatibility:** Certified by manufacturer for use with specific bi-level control system and lamp type indicated.
 - d. **Compatibility:** Certified by manufacturer for use with specific dimming control system and lamp indicated.
4. **Provided that all the above conditions and specifications are met or exceeded, the following manufacturers producing solid-state electronic ballasts shall be considered acceptable:**
 - a. ULT
 - b. Advance
 - c. Osram/Sylvania

2.5 LAMPS

A. General:

Unless otherwise indicated, all lamps (fluorescent, HID, tungsten halogen, etc.) specified shall be as manufactured by G.E. Venture, Osram/Sylvania or Philips, or approved equal by others. Substitutions of lamps by other manufacturers shall be equal in all respects of the following:

1. Initial and maintained lumen output
2. Lamp life
3. Correlated color temperatures (in degrees Kelvin)
4. Color rendering index (CRI)
5. Compatibility with specified equipment
6. Substitutions shall be submitted for approval in the form of both manufacturer's printed data and corresponding samples for review.

- B. All lamps shall comply with the requirements of the Energy Policy Act of 1992 or its latest edition.
- C. All lamps where applicable shall comply with ANSI C78 Series standards.
- D. Fluorescent:
Fluorescent lamps shall be of the specified wattage and lumen output as indicated in the fixture schedule. Lumen output at 33% rated life shall not be less than 80% of initial output. Contractor shall replace any lamps failing during the first two hundred (200) days of burning after final written acceptance by the City of New York.
 - 1. Fluorescent: T-5 Lamps:
 - a. 4'-T5HO/54 watt:
Unless otherwise indicated or authorized, all linear fluorescent lamps for use on this project shall be 54 watt 4'-0" mini bi-pin base, T-5 425 mA, 3500K triphosphor type (only) as manufactured by G.E., Osram/Sylvania or Philips, with a minimum CRI of 85. Lamp shall have an average rated life (3 hours/start) of 36,000 hours, and produce at least 5,000 lumens initial.
- E. The Contractor shall provide all lamps as called out in the lighting fixture schedule or specifications. The Contractor shall, upon request, produce a schedule of the lamps being proposed for use on the project.

2.6 FINISHES

- A. Painted surfaces shall be synthetic enamel with acrylic, alkyd, epoxy, polyester or polyurethane base, light stabilized, baked on at 350 degrees Fahrenheit minimum, catalytically or photochemically polymerized after application.
- B. White finishes minimum 90% reflectance (semi-gloss).
- C. Selection: Unless otherwise indicated, all external fixture finishes shall be as selected by the Commissioner. Unless otherwise indicated, all fixture finishes shall be semi-gloss polyester powder coat enamel (color to be selected by Commissioner).
- D. Undercoat: Except for stainless steel all ferrous metal surfaces shall be given a five stage phosphate treatment or other acceptable base bonding treatment before final painting and after fabrication.
- E. Unpainted non-reflecting surfaces shall be satin finished and coated with a baked-on clear lacquer to preserve the finish. Where aluminum surfaces are treated with an anodic process, the clear lacquer coating may be omitted.
- F. 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.

- G. Metal finishes: Provide finishes of the color and type indicated and having the following properties:
1. Protection of metal from corrosion: 5-year warranty against perforation or erosion of the finish from weathering.
 2. Color retention: 5-year warranty against fading, staining, or chalking from weathering including solar radiation.
 3. Uniformity: Provide finish of uniform thickness and color, free from streaks, stains or orange peel texture.

2.7 REFLECTORS

- A. Reflectors, cones or baffles shall be absolutely free of spinning lines, stains, ripples or any marks or indentations caused by riveting to other assembly techniques. No rivets, springs or other hardware shall be visible after installation.
- B. Downlight reflectors shall provide minimum 45 degree lamp and lamp image cut-off unless otherwise specified.
- C. Cone flanges shall be formed as an integral part of the cone and shall have identical color and finish as the cone, except as shown. The flange's major surface shall be perpendicular to the cone axis.
- D. The reflecting surface of the cone or reflector shall be tested for proper sealing. Test per ASTM B136-63T. If any stain is visible, the specimen shall not be considered to have been properly sealed. Reflector cones shall be free of manufactured defects. The reflector inner surface shall be free of water spotting and shall maintain a reflectivity ratio of not less than 83% on clear specular finish.
- E. All alzak parabolic cones shall be guaranteed by the manufacturer against discoloration for a minimum of ten years and in the event of premature discoloration shall be replaced by the manufacturer (including both materials and the cost of labor) at no cost to the City of New York.
- F. Where modification of standard fixtures are specified, fixtures shall be modified as required with lamp sockets positioned to provide desired photometric performance.
- G. Specular clear alzak reflector cones and parabolic louvers specified with the use of compact fluorescent lamps or triphosphor fluorescent lamps shall be provided with clear non-iridescent coating.
- H. All fixtures with removable reflectors, louvers or baffles shall be supplied with safety chains. Contractor shall be responsible for insuring that all safety chains are securely fastened to reflector and housing.

2.8 STEMS

- A. Each stem shall have a brass or steel swivel, hang straight, or other self-aligning device.
- B. Stems shall be made of rigid metallic (steel) pipe only, minimum wall thickness of 0.062".
- C. Wherever a fixture or its hanger canopy is applied to a surface mounted outlet box a finishing ring shall be utilized to conceal the box.
- D. Unless otherwise indicated, all stems shall match in color and finish the color of the fixture which they support. Where no color is indicated, stems shall be semi-gloss baked white enamel.
- E. Stems shall at the completion of installation and all other work be free of clamp marks, scratches and all other visual imperfections.
- F. Unless otherwise indicated, stems shall be provided in order to adequately mount and level each fixture run with proper structural support per manufacturer's recommendations.
- G. Pendant Fixtures: Install pendant lighting fixtures plumb and at a height from the floor as specified on the drawings. In cases where conditions make this impractical, refer to the Commissioner for direction. Use ball aligners and canopies on pendant fixtures unless otherwise noted.
- H. Pendant stems shall be equally spaced along every fixture run. If field conditions or fixture construction do not allow for this condition, the installing Contractor shall immediately notify the Commissioner prior to commencement of the work.

2.9 LENSES, LOUVERS AND DIFFUSERS

- A. Lenses/Louvers: General:
 - 1. All lenses, diffusers, and shielding media shall be properly and securely mounted within fixture assemblies. Lay in type lenses and louvers shall not be acceptable. All shielding materials shall be tightly fitted with no loose panels or parts and shall show no visible light leaks of unintentional or unscheduled light.
 - 2. All fixtures with removable cones, louvers or other shielding devices shall be supplied with safety chains. Contractor shall be responsible for insuring that all safety chains are securely fastened to housing and shielding device.
- B. Lenses: Plastic
 - 1. Unless otherwise indicated or otherwise authorized, all plastic shielding, lenses and diffusers shall be white opal clear 100% UV stabilized virgin acrylic or in special cases high impact polycarbonate (lexan). Use of polycarbonate lenses shall be restricted to those areas outlined in the National Electric Code (latest Bulletin). Use of polystyrene components is absolutely prohibited.

2. Plastic for lenses and diffusers shall be formed of colorless 100% virgin acrylic as manufactured by Rohm & Haas, DuPont, G.E. or equally acceptable manufacturers. The quality of the raw material must meet American Society of Testing Materials (ASTM) standards, 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.

C. Lenses: Glass

1. Unless otherwise indicated or authorized all glass shielding, diffusers or lenses shall be clear tempered borosilicate glass. Soda lime glass material shall not be acceptable. Submit samples of glass elements upon request.
2. Glass used for lenses, refractors and diffusers in incandescent and tungsten halogen 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 92%. For exterior fixtures use tempered borosilicate glass, Corning No. 7740 or equal. For fixtures directly exposed to the elements and aimed above the horizontal with a radiant energy of 4.16 watts per square inch or greater, use Corning Vycor glass or equal.
3. Where optical lenses are used, they shall be free from spherical or chromatic aberrations and other imperfections, which may hinder the functional performance of the lenses.
4. Mechanical: All lenses, louvers or other light diffusing elements shall be removable but positively held so that hinging or other normal motion will not cause them to drop out.

2.10 MISCELLANEOUS

- A. Where (or if) indicated all remote step-down transformers and ballasts shall be properly wired to fixtures to insure that voltage drop does not exceed 5%, regardless of transformer's or ballast's location.
- B. All remote step down transformers and ballasts shall be mounted in approved NEMA type enclosures and only located in areas previously deemed to be readily accessible by the City of New York's maintenance personnel.
- C. Where indicated, all uplight or wallwash coves utilizing fluorescent equipment shall be installed so as to produce a continuous and unbroken band of light free of visual imperfections, socket shadows, light gaps, etc. The inability to provide this appearance shall be brought immediately to the Commissioner's attention prior to installation.
- D. All fixture lengths whether straight or curvilinear shall be fabricated based upon the fixture manufacturer's or contractor's field verified dimensions only.
- E. Fixture manufacturer shall coordinate conduit entry locations with installing contractor.

2.11 CUSTOM FIXTURE FABRICATION: APPROVED MANUFACTURERS

Provided that the specifications and requirements contained herein are met or exceeded, the following manufacturers shall be amongst those considered to perform the Work:

- | | |
|---|--|
| a) Icon
500 Callalhan Road
North Kinstown, RI 02852
(401) 295-2533 | b) Forum
908 Old Freeport Road
Pittsburg, PA
(412)781-5970 |
| c) A+L
15 Commercial Blvd.
Medford, NY 11763
(631) 698-8919 | d) Design Plan Lighting Inc.
79 Trenton Avenue
Frenchtown, NJ 08825
(908)996-7710 |

2.12 LIGHTING FIXTURE SUPPORT COMPONENTS

Provided that the specifications and requirements contained herein are met or exceeded, the following manufacturers shall be amongst those considered to perform the Work:

- A. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- B. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- C. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
- D. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage (2.68 mm).
- E. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- F. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The Contractor shall furnish and install lighting fixtures as noted on the drawings. Fixtures shall be completely wired and lamps installed and shall be in perfect operating condition at the time of completion.
- B. **Setting and Securing:** The Contractor shall set lighting fixtures plumb, square, and level with ceiling and walls, in alignment with adjacent lighting fixtures, and secure in accordance with manufacturers' directions and approved shop drawings. Conform to the requirements of NFPA 70.
- C. **Mounting:** Mounting heights specified or indicated are to bottom of fixture for suspended and ceiling-mounted fixtures and to center of fixture for wall-mounted fixtures. Obtain approval of the exact mounting for lighting fixtures on the job before installation is commenced and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed.
- D. **Coordination:** The installing Contractor shall communicate with other trades as appropriate to properly interface, schedule and coordinate installation of lighting fixtures with other work.
- E. **Grounding:** The Contractor shall ground non-current-carrying parts of electrical equipment. Where the copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.
- F. Installation of fixture locations shall be in strict accordance with the intent of the contract drawings and approved shop, specifications and drawings.
- G. **Fixture locations:** 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, unless otherwise noted on architectural plans.
- H. Unless otherwise shown on the Contract Drawings, lighting fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the lighting fixture. The design of hangers and the method of fastening other than what is shown on the Contract Drawings, or herein specified, shall be submitted to the Commissioner for approval.
- I. The Contractor shall provide all hangers, rods, mounting brackets, supports, frames, earthquake clips and other equipment normally required for the proper, safe and distortion-free installation in the various surfaces in which they appear. Determine surface types from the architectural drawings.
- J. **Instructions:** Each lighting fixture shall be packaged with complete illustration and instructions showing how to install. Install lighting fixtures in strict conformance with manufacturer's recommendations and instructions.

- K. The Contractor shall rigidly align continuous rows of lighting fixtures for true aligned appearance.
- L. The Contractor shall support all lighting fixtures independently of ductwork or piping.
- M. Splices in internal wiring shall be made with approved insulated "wire nut" type mechanical connectors, suitable for the temperature and voltage conditions to which they are subjected.
- N. All wire utilized for connections to or between individual lamp sockets and lamp auxiliaries (i.e., wires which do not constitute "through circuit" wiring) shall be suitable for temperature, current, and voltage conditions to which it is subjected.
- O. The Contractor shall install reflector cones, baffles, aperture plates, light controlling elements for air handling fixtures and decorative elements after completion of ceiling tiles, painting and general cleanup.
- P. The Contractor shall replace blemished, damaged, or unsatisfactory fixtures as directed by the City of New Yorks' representative.
- Q. All pendant mounted lighting fixtures within the same room or area shall be installed plumb, and at a uniform height from the finished floor. Adjustment of desired height (if required) shall be made during the installation phase. Unless otherwise shown on the Contract Drawings, stems and canopies shall be matched to the associated lighting fixtures.
- R. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.
 - 1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches (150 mm) from lighting fixture corners.
 - 2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
 - 3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.
 - 4. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.
- S. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- T. Air-Handling Lighting Fixtures: Install with dampers closed and ready for adjustment.

- U. Adjust aimable lighting fixtures to provide required light intensities.
- V. Connect wiring according to Division 16 Section "Wires and Cables-600 Volts and Below."

3.2 ADJUST AND CLEAN

- A. Clean: Clean lighting fixtures of dirt and debris upon completion of installation.
- B. Protection: Protect installed fixtures from damage during remainder of construction period.

3.3 FIELD QUALITY CONTROL

- A. Tests: Upon completion of installation of lighting fixtures, and after building circuits have been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

3.4 AIMING AND ADJUSTMENT

- A. All adjustable lighting units shall be aimed, focused, locked, etc., by the Contractor under the supervision of the Commissioner. The Commissioner shall indicate the number of crews (foreman and apprentice) required. All aiming and adjusting shall be carried out after the entire installation is complete. All ladders, scaffolds, lift equipment, safety belts, flashlights, walkie talkie equipment, etc. required shall be furnished by the Contractor at the direction of the Commissioner. As aiming and adjusting is completed, locking set screws and bolts and nuts shall be tightened securely.
- B. Night work: Where possible, units shall be focused during the normal working day. However, where daylight interferes with seeing, aiming shall be accomplished at night.
- C. Prior to final inspection, relamp all fixtures which have failed lamps, or lamps where visible color shift has occurred, and leave all lighting fixtures, equipment, and accessories in good, uniform operating condition. The Contractor shall replace any burned-out lamp during the first 100 days after the completion of the Contract.

3.5 LUMINAIRE INSTALLATION

- A. General: Install luminaires at locations and heights as indicated, in accordance with the manufacturer's written instructions, applicable requirements of NFPA 70, ANSI C2 and with recognized industry practices to ensure that lighting installation fulfills requirements.
- B. Support: Fasten luminaires securely to indicated structural supports; and check to ensure that the required degree of freedom is provided to allow alignment or aiming of the fixtures for indicated light distribution.
- C. Condition: Clean luminaires of dirt and debris upon completion of installation. Do not damage finishes or lens or refractor surfaces.

- D. Grounding: Provide equipment grounding connections using branch circuit equipment and connected sufficiently tight to assure a permanent and effective ground.

END OF SECTION 16500

SECTION 16600 – LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Contract Documents: Drawings and General and Special provisions of the Contract, including bidding requirements, General Conditions, General Requirements of the Specifications apply to work of this section.

1.2 DESCRIPTION

- A. General: Extent of lighting control system work is indicated on drawings and schedules, by requirements of this Section, and Section 16050, "Basic Electrical Materials and Methods."

- B. Types: Types of control systems in this Section shall include the following:

- 1. Architectural
- 2. Auxiliary Equipment

- C. Related Sections: Provide a system in accordance with the requirements specified under this section, as shown on the Contract Drawings and as required for the lighting system to comply with the NYCEC. Refer to other sections of Division 16 for the following:

- 1. Division 16 Section "Electrical Identification."
- 2. Division 16 Section "Basic Electrical Materials and Methods."
- 3. Division 16 Section "Electrical Requirements for Shop Assembled Equipment."
- 4. Division 16 Section "Wires and Cables - 600 Volts and Below."
- 5. Division 16 Section "Electrical Raceway System."
- 6. Division 16 Section "Wiring Devices."
- 7. Division 16 Section "Panelboards."
- 8. Division 16 Section "Control Components and Devices."
- 9. Division 16 Section "Lighting Equipment Lamps and Ballasts."

- D. REFERENCES

Lighting controls, operations and devices shall comply with the latest applicable provisions and recommendations of the following:

- 1. NEC 2008 - National Electrical Code.
- 2. New York City Construction Codes.
- 3. 4. UL 924 - Emergency Lighting and Power Equipment.
- 5. LCA - Lighting Controls Association.
- 6. UL916: Energy Management Equipment

- E. The extent of lighting control work includes, but is not limited to, the furnishing and installation of all lighting control components into complete and working lighting control systems as specified in this section, on the drawings, and as required by job conditions. System components include, but are not limited to:

1. Factory pre-assembled and pre-wired lighting control panelboards containing integral networkable low voltage lighting control chassis, networkable intelligent lighting control module, programmable breakers and related equipment for control of dimmed and non-dimmed loads.
2. Control stations, including wall mounted low voltage remote controls.
3. Control system network low voltage wiring for interconnection of lighting control panelboards, remote switches and master control stations.
4. Photosensor(s) for operation of selected circuits.
5. Permanently installed terminal(s) and master control stations for system programming and feedback.
6. CONFORMANCE: System shall be manufactured in strict accordance with the Contract Drawings and Specifications.
7. IMPORTANT: Information regarding circuit designation, sizes and quantities is indicated elsewhere. Circuiting indicated in this section is included only to specify dimmer sizes and control capacities. DO NOT use this information for sizing branch circuit breaker panelboards, wiring or any other work not included in this section.

1.3 SUBMITTAL

- A. Division 1: Conform to the provisions of the contract
- B. Product Data: Submit manufacturer's data on dimmers and controllers.
- C. Shop Drawings: Submit dimensioned drawings of control system components. Submit shop drawings with proposed component and accessories clearly indicated on each sheet. Shop drawings must be submitted for review before fabrication. Fabrication details may vary slightly from those shown on drawings provided those changes do not adversely affect ease of installation, durability, performance or suitability.
- D. Shop Drawings: Detail assemblies of standard components, custom assembled for specific application on this Project.
 1. Outline Drawings: Indicate dimensions, weights, arrangement of components, and clearance and access requirements.
 2. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components.
 3. Wiring Diagrams: Power, signal, and control wiring. Coordinate nomenclature and presentation with a block diagram.
- E. Coordination Drawings: Submit evidence that lighting controls are compatible with connected monitoring and control devices and systems specified in other Sections.
 1. Show interconnecting signal and control wiring and interfacing devices that prove compatibility of inputs and outputs.
 2. For networked controls, list network protocols and provide statements from manufacturers that input and output devices meet interoperability requirements of the network protocol.

- F. Provide a load schedule which indicates the actual connected load and load type per circuit, circuits and their respective control zones, circuits that are on emergency, and the capacity, phase, and corresponding circuit numbers (per the electrical drawings).
- G. Manuals: Prior to final inspection, provide six (6) complete sets of operating and maintenance manuals. Include technical data sheets and parts ordering information. Include testing and maintenance requirements and instructions for emergency transfer components.
- H. Shop drawings shall be submitted in reproducible form. Fixture fabrication details shall be drawn at either full size or half size scale. Fabrication details shall illustrate a minimum of three (3) critical views indicating all fabrication and assembly methods, materials, material gauges and finishes to be employed.
- I. Catalogue submittals lacking sufficient detail to indicate compliance with contract documents shall not be acceptable.
- J. "Approved Equal" specification status does not and shall not exempt the identified manufacturers from full and complete compliance with all criteria identified in the specifications with regards to performance, control capability, size finishes, etc. Consideration, acceptance or rejection of any proposed submittal at any time shall rest solely upon the evaluation of the Commissioner for those areas within the project scope.
- K. Complete facility floor plans indicating location of all components raceways and wiring of the lighting control system.

1.4 QUALITY ASSURANCE

- A. All lighting control systems and components and sub-components shall be manufactured, furnished and installed in compliance with all government agencies having jurisdiction. All fixtures shall bear the appropriate UL (or ETL) and IBEW identifications. Panelboards and integral Lighting Control Chassis are to be UL listed under UL 916 Energy Management Equipment, UL 67 Panelboard Interiors and UL 5 panelboard box.
 - 1. Source Limitations: Obtain lighting control module and power distribution components through one source from a single manufacturer.
 - 2. 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.
 - 3. Comply with 47 CFR, Subparts A and B, for Class A digital devices.
- B. Manufacturers: Provide products of firms regularly engaged in the manufacture of lighting control equipment of the types and ratings whose products have been in satisfactory use in similar service for not less than 3 years.
- C. National Fire Protection Association (NFPA): Comply with NFPA 70, "National Electrical Code," as applicable to construction and installation of interior building lighting fixtures and emergency lighting.

- D. Regulatory Requirements: Cabinets and all related components and subsystems shall comply with the following regulatory requirements:
1. National Electric Code (N.E.C) [Article 100]
 2. National Electrical Manufacturer's Association (N.E.M.A)
 3. Underwriter's Laboratories, Inc. (UL) or (ETL)
 4. Any local jurisdictional codes (NYC)
- E. Materials and equipment, as well as workmanship, shall conform to the highest commercial standards and shall be as specified and/or as indicated on the drawings. Parts not specifically identified shall be made of materials most appropriate for their intended use.
- F. Manufacturers: Manufacturers listed or approved equal in the lighting control specification shall be assumed capable of supplying the listed systems unless clearly written exceptions are set forth in their quotations. Any such exceptions shall immediately be brought to the attention of the Commissioner. Manufacturers not listed (or approved equal) must comply with the following:
1. Experience: Manufacturers shall have not less than three (3) years experience in design and manufacturing of lighting control equipment of the type and quality shown. Submission must include a list of completed projects and dated catalogue pages or drawings indicating length of experience.
 2. Samples: Manufacturers shall submit a prototype sample of each control station for review by the Commissioner. Prototype samples shall be sufficiently detailed and operational to allow evaluation of compliance with the salient features of the specification. Preliminary design or shop drawings shall not be accepted in place of prototype samples (see Section 1.08).
- G. All major system components shall be manufactured and supplied by one company.
- H. Manufacturer shall have their quality system registered to the ISO 9001 Quality Standard, including in-house engineering for all product design activities.
- I. Lighting control system shall meet IEC801-2, tested to withstand a 15kV electrostatic discharge without damage or loss of memory.

1.5 WARRANTY

- A. The entire lighting control system [unless noted otherwise] shall carry a manufacturer warranty for three (3) years from date of start-up after final written acceptance by the City of New York.
- B. For the duration of the warranty the control system manufacturer shall provide 24 hour, 7 day emergency service contact with trained factory personnel. Maximum acceptable response time to a call for service shall be 12 hours. At the end of the warranty period, the manufacturer shall submit to the City of New York a proposal for a continued maintenance contract for the entire control system.
- C. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lighting controls that fail in materials or workmanship within

specified warranty period.

1. Warranty Period: Cost to repair or replace malfunctioning parts for three (3) years from date of written acceptance by City of New York.
 2. Extended Warranty Period: Cost of replacement parts that failed in service due to transient voltage surges (materials only, f.o.b. the nearest shipping point to Project site) for eight years.
 3. Extended Warranty Period: Cost to repair or replace electrically / mechanically held relays for 10 years from date of Substantial Completion.
- D. Each manufacturer shall submit for review and approval the name of the person/persons or agency who will be charged with the responsibility of fulfilling the manufacturer's field service obligations for the life of the warranty.
- E. Warranty shall ensure that the Lighting Control System manufactured and supplied will be the kind and quality described in the specification and will be free of defects in workmanship and material.
- F. The manufacturer shall make available to the Commissioner a method of ordering new equipment for expansions, replacement, or replacement parts for a minimum period of ten years from the final date of acceptance to be used as spares twenty-four hours a day, seven days a week.

1.6 TECHNICAL AND ADMINISTRATIVE REQUIREMENTS

- A. The submission of a bid by the Contractor will be construed as evidence that a careful, complete and thorough examination of the premises, existing job conditions and Contract Documents has been made and later claims for labor, materials or equipment required or for difficulties encountered, which could have been foreseen had such an examination been made, will not be recognized. It shall also constitute a representation that the Contractor has checked and verified all quantities, work and materials involved and shall take complete responsibility for any deficiencies encountered thereafter.
- B. The Contractor shall insure that the lighting control system manufacturer shall keep on file and make available for review by the Commissioner and the City of New York complete Quality Control and Quality Assurance records for all phases of production for all lighting equipment to be supplied under this project.
- C. The Contractor shall be solely responsible for coordinating and expediting the timely procurement and delivery for the lighting control system, equipment and related components for the project.
- D. Specifications and drawings are intended to convey the salient features, function and character of the control system only, and do not undertake to illustrate or set forth every item or detail necessary for the work. Minor details not usually indicated on the drawings nor specified, but that are necessary or normally required for the proper execution, completion, installation and operation of the control systems shall be included, the same as if they were herein specified or indicated on the drawings.

- E. 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 normally required in the production of the lighting control equipment. The full and complete responsibility for accurately fabricating the control systems described herein to the fulfillment of those specifications shall rest solely with the Contractor.

1.7 SPARES

- A. As part of this contract, the installing Contractor shall furnish and provide the following spare material components:
 - 1. 10 percent of each type of occupancy sensor and photocell but not less than 5 each.
 - 2. 10 percent of each type relay, timer, switch and contactor, but not less than 2 each.
 - 3. 1 spare monitor of each type.
 - 4. 5 backup copies of the software program for the system on digital disks.
 - 5. Six (6) start-up copies for the PC operating system.
 - 6. 10 percent of each type 0-10V dimming control card.

1.8 SAMPLES

- A. Upon request, submit for review one representative sample of each lighting control station required under this Contract. After sample acceptance, the control station shall be sent to the project for use as a standard. In the event the submission is rejected, the control station will be returned to the manufacturer who shall immediately make a new submission which meets the contract requirements.
- B. Shipping: The samples must be actual working devices to be supplied and shall be submitted complete, ready for energizing and examining and shall be shipped (prepaid) by Contractor to the Commissioner or as otherwise specified or directed.

1.9 SUBSTITUTIONS

Equipment included under this section is specified by approved manufacturer, type, function to establish minimum standards of quality for bidding. Furnish equipment as specified unless substitutions are agreed upon.

1.10 PROJECT/SITE CONDITIONS

- A. The architectural lighting controls must operate in an ambient temperature range of 0°C (32°F) to 40°C (104°F) and 90% non-condensing relative humidity without the requirement of a regularly scheduled maintenance program for air filtration components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

The following manufacturers (listed alphabetically) shall be considered:

Acuity Brands Controls	: New York, NY	212 462-0088
Douglas Controls	: Burnaby, BC Canada	604 873-2797

Watt Stopper

: Santa Clara, CA

408 988-5331

2.2 FUNCTIONAL SYSTEM DESCRIPTION

A. General

1. The lighting control system is a networked system that communicates via RS485. The system must be able to communicate with fully digital centralized relay panels, dimming relay panels, digital switches, photocells, various interfaces and shall include all operational software. The intent of the specification is to integrate all lighting control into one system, except for areas controlled by a single motion sensor such as rooms with a single luminaire and emergency fixtures designed to operate 24/7. Lighting control system shall include all hardware and software. Software to be resident within the lighting control system. System shall provide local access to all programming functions at the master LCP and remote access to all programming functions via dial up modem and through any standard computer workstation running an industry standard internet browser. Lighting control system shall have server built into the master LCP that "serves" HTML pages to any authorize workstation. Desktop computers are not part of this section and will be provided by others.
2. System software shall provide real time status of each relay, each zone and each group.
3. All devices shall be pre-addressed at the factory. Field addressing is not acceptable
4. All programs, schedules, time of day, etc, shall be held in non-volatile memory for a minimum of 10 years at power failure. At restoration of power, lighting control system shall implement programs required by current time and date.
5. System shall be capable of flashing lights Off/On any relay or any zone prior to the lights being turned Off. The warning interval time between the flash and the final lights off signal shall be definable for each zone. Occupant shall be able to override any scheduled Off sweep using local wall switches within the occupied space. Occupant override time shall be locally and remotely programmable and not exceed 2-hours.
6. The system shall be capable of implementing On commands, Off commands, Raise (dimming) commands, Lower (dimming) commands for any relay, group or zone by means of digital wall switches, specification grade line voltage type wall switches, photocell, web based software or other devices connected to programmable inputs in a lighting control panel.
7. The lighting control system shall provide the ability to control each relay and each relay group per this specifications requirement. All programming and scheduling shall be able to be done locally at the master LCP and remotely via dial up modem and via the Internet. Remote connection to the lighting control system shall provide real time control and real time feedback.

8. System may consist of centralized relay panels, dimming relay panels, digital switches, photocells and various digital interfaces. Verify exact components specified. Dimming relay panels, smart breaker panels, centralized relay panels and digital switches shall communicate as one network via RS485. Dimming relay panels, mounted in each local area, per plans shall control all lighting fixtures in that space, provide power to occupancy sensors and take input from daylight sensor and occupancy sensors. Dimming relay panels shall be capable of taking inputs from standard, line voltage type switches and outputting up to 8 independent 0v to 10v dimming signals.

2.3 NETWORKABLE LIGHTING CONTROL SYSTEM DESCRIPTION

The networkable lighting control system shall consist of pre-assembled lighting control panelboards complete with integral networkable low-voltage lighting control module, low-voltage switches and their associated wiring to allow control of the lighting.

A. Lighting Control Relay Panels

1. Physical Characteristics

- a. Relay panels shall be certified UL508 and cUL.
- b. Panels shall be constructed of steel NEMA 1 IP-20 protection rated enclosure with hinged door.
- c. Relay panels shall be able to be mounted surface or flush in a typical 4" deep wall. Flush mounted cabinets require field installation of a flush mount trim kit which can be applied to any relay panel.
- d. Relay Panel dimensions shall be less than or equal to 30-1/2" in width, allowing the panels to be installed in two standard 16" stud spaces.
- e. Panels shall be provided with a locking hinged door which can be removed for ease of installation.
- f. Knockouts shall be provided at various locations on the relay cabinet for both line and low voltage connections.

2. Electrical Requirements

- a. Relay panels shall include an integral power supply to power Control Modules, Backplane, Keypad, and other accessories which may be powered directly or indirectly from the Relay Panel. An optional external power supply may be used to power external accessories and control devices.
- b. Control Backplane shall provide data bus and data intercommunication between all Relay Modules, Control Module, and Low Voltage Inputs.
- c. Standard Relay Panel shall accept to a tolerance of +/- 10% the following incoming voltages: 120VAC, 277VAC, 347VAC.
- d. Optional voltage barriers for field installation shall be available to separate differing voltages as/if shown on the Contract Drawings. If a configured cabinet is required, voltage barriers shall be pre-installed in the Relay Panels.
- e. Circuit protection shall be provided to protect the Relay Panel electronics from overload or short circuits.

B. Control Module**1. Physical Characteristics**

- a. The control module for all Relay Panels shall be a single self-contained unit, secured into the panel with readily accessible mounting screws, and shall be field installable and/or replaceable.
- b. The Control Module shall receive all power from the power supply, integral to the Relay Panel and shall distribute power to all connected device and accessories as required. The total available power for all connected devices shall be at least 500mA at 24VDC. Voltage supplied to connected devices shall be +24VDC.
- c. The Control Module shall be pre-installed into the cabinet.

2. Operation and Features

- a. The Control Module keypad interface shall offer the following user interface components:
 - i. LCD Display to indicate:
 - (a) Current Status
 - (b) Error Conditions
 - (c) Current Date and Time
 - (d) Programming confirmation and feedback
 - ii. Alphanumeric data entry keys
 - iii. Arrow Keys
 - iv. Lock/Unlock Relay
 - v. Relay/Group On/Off
 - vi. Programming Keys
- b. The Control Module keypad interface shall offer the following features:
 - i. Programming of relay cabinet features and operation
 - ii. Relay On/Off
 - iii. Timed Relay/Group OFF
 - iv. Network Relay Groups On/Off
 - v. Lock/Unlock Relay state

3. The backplane interface shall be configured to incorporate the following features:

- a. Individual Relay Status
 - i. On
 - ii. Off
 - iii. Locked On
 - iv. Locked Off
 - v. Override On
 - vi. Override Off
- b. Control Module Microprocessor Online
- c. Ethernet Link
- d. Modem Connection

- e. Relay Communication Microprocessor
- f. +5VDC Power Supply Normal Operation

C. Basic Control Module

1. The following control protocols shall be supported:
 - a. Low Voltage Inputs: (8) or (12) 0-10VDC inputs, depending on cabinet size.
 - b. Internet Modem.
 - c. The following features shall be supported:
 - i. Software/Firmware Version Display
 - ii. Relay Group On/Off Delay/Sequencing
 - iii. Adjustable On/Off channel trigger points
 - iv. Bypass on, or Bypass Off switch
 - v. Emergency Input
 - vi. Time, Time Clock, Scheduler, and Astronomical features
 - (a) 12 or 24-Hour Clock
 - (b) Automatic Daylight Savings Time Adjustment
 - (c) Latitude and Longitude data entry
 - (d) Sunrise/Sunset offsets
 - (e) Holiday and Holiday Schedule Event Engine.
 - d. Blink Warn
 - i. Adjustable time between Blink Warn and Lights Off
 - ii. Adjustable time of blink flash
 - iii. Individual relays shall be selectable for the blink warn feature
 - e. After Hours Sweep with adjustable time
 - f. Relay Groups
 - i. Each relay can be assigned to a maximum of 32 groups.
 - ii. The network shall support up to 65,000 groups
 - g. Priorities
 - i. The system shall support up to 16 priorities
 - ii. Each control input or internal event can be assigned a priority level
 - iii. Higher priorities shall take and maintain control until a "relinquish" command has been issued for that relay.
 - iv. Priority control is applied on a relay-by-relay basis.
2. Low Voltage Switch support
 - a. Low Voltage Switch inputs shall be supported through the Low Voltage inputs.
 - b. Switch inputs can be triggered by either an "active low" (pull to common) or an "active high" (pull to + voltage) signal

- c. Feedback shall be returned by the panel to the switch as either +V or common. Feedback can be used to illuminate LEDs in the low voltage switch.
- d. Inputs can be assigned the following functions:
 - i. Momentary (assigned relays operate in toggle behavior, press for on, press for off)
 - ii. Maintained (assigned relays are on while pressed, off when released)
 - iii. Preset On (assigned relays turn on, all other relays in the preset group turn off when depressed and released)
 - iv. Preset Off (all relays in the preset group turn off when depressed and released).

3. Photocell Support

- a. Photocells shall be connected to the Low Voltage Inputs
- b. (14) "Rising" and (14) "Falling" trigger points shall be configurable for each photocell
- c. Any Relay can be assigned to any photocell trigger point
- d. Any Group can be assigned to any photocell trigger point
- e. Multiple photocell operational modes shall be support to allow for varying applications.
- f. System shall be capable of operating either closed loop or open loop type sensors.

4. Occupancy Sensor Support

- a. Occupancy sensors shall be connected to the low voltage inputs
- b. Occupancy sensors shall support multiple behaviors allowing for varying applications.
- c. Occupancy sensors shall support the blink-warn feature.
- d. A delay off time shall be set establishing the time which must elapse between occupancy sensor signal and the assigned action.
- e. Any Relay can be assigned to any occupancy sensor.
- f. Any Group can be assigned to any occupancy sensor.

5. Contact Closure

- a. Contact Closures shall be connected to the low voltage inputs.
- b. Any contact closure can be assigned any action.
- c. Any contact closure can be assigned any scheduled event/action.

D. Network Control Module

- 1. The Network Control Module shall support all control protocols of the basic control module. The following additional control protocols shall be available:
 - a. Digital Switch
 - b. Master/Slave Network communication
 - c. Distributed processing stations.

2. The Network Control Module shall support all features of the basic control module. The following additional features shall be available in the network control module:
 - a. Assignment of distributed processing stations address to any relay
 - b. Configuration of all digital switch inputs (maximum of 206 total buttons per network).
3. The Network Control Module shall support Master/Slave Operation:
 - a. Up to (252) Local + Slave Relays.
 - b. All slave cabinet features, functions, events, and signals are controlled and programmed from the master control module.

E. Output Relays

- a. UL Listed 30 Amp, Latching, 18,000 SCCR, 277VAC Ballast and HID and 20 Amp Tungsten at 120 Vac
- b. Relays shall be individually replaceable. Relay terminal blocks shall be capable of accepting two (2) #8AWG wires on both the line and the load side. Systems that do not allow for individual relay replacement or additions are not acceptable.
- c. Relays to be rated for 250,000 operations minimum at a full 30a lighting load, default to closed at normal power loss, Normally Closed Latching (NCL). All incandescent circuits shall be energized by use of a Normally Closed SoftStart™ (NCSS) relay rated at 100,000 operations at full 20a load.
- d. Optional relay types available shall include: Normally Open Latching (NOL) relay rated for 250,000 operations, a 600v 2-pole NO and NC and a Single Pole, Double Throw (SPDT) relay

2.4 LOW VOLTAGE REMOTE PUSH BUTTON STATIONS

A. General

1. The distributed processing station system shall be a lighting control system designed specifically for the control of architectural lighting. Large networks of wall stations shall support assembly using Multiple Protocol Converters (input/output nodes), which are capable of utilizing several data transmission methods depending on the application. The network shall offer distributed processing station and Ethernet protocols as a minimum.
2. The system architecture shall be based on a peer-to-peer network, where the failure of any single component or node shall not cause loss of other system functions. Systems that require a central processor for system operation are not acceptable.
3. Systems shall be grouped in up to 128 station nodes to form a "subnetwork." Multiple protocol converters ("input/output nodes") can be used to join subnetworks together. Network controls shall utilize CAT.5 cable and standard network topology.

4. Each subnetwork shall use CAT.5 cable with maximum overall length of 4000 ft.
5. Each subnetwork shall use distributed processing as the primary protocol.
6. Each node on a subnetwork shall have a unique logical identifier ("ID") numbered from 0 to 255.
7. Each subnetwork shall control a maximum of 2048 dimmer channels.
8. Station nodes may be linked to other station nodes on the same or different subnetwork. Linkages may be changed at any time by any other station or I/O node capable of transmitting the necessary distributed processing commands.
9. Exposed station dimensions shall be 4-1/2"Hx3"Wx1/2"D. Station shall mount in standard 1-gang back box (min dimension 2-3/4"Hx1-3/4"Wx2"D).
10. Station shall contain from 1 to 6 momentary push buttons. Buttons shall be selectively backlit by LEDs. Buttons shall operate in momentary or toggle modes. Pressing a button shall cause a pre-programmed lighting control command to be transmitted on the subnetwork.

2.5 NETWORKABLE LIGHTING CONTROL SYSTEM FEATURES

- A. Memory Loss - Time schedules, time clock and panelboard configuration shall be protected by battery-backed memory in the event of a power loss. The battery back-up will be rated for a period of 10 years.
- B. RS-232 Serial Communications Port - This type of port shall be provided for use with operator's station, modem or laptop operator's terminal.
- C. The networkable feature shall permit a minimum 250 lighting control devices to be connected via CAT.5 cable over the local operating network. The network shall be a high speed, high reliability network designed to operate in the noisy environment of commercial and industrial buildings.
- D. Load Bypass, On, Off, Restore Switches - The load bypass, on, off, and restore feature shall provide the ability to halt any scheduled time-of-day functions and control the loads manually. Bypass shall sweep the loads "All On" or "All Off." When manual operation is no longer required the Restore Switch shall return the lighting control panelboard to its scheduled time of day and make the appropriate load changes as per the schedule.
- E. Standalone - The Standalone feature shall permit the lighting control panelboard to operate without a central computer. All the time-of-day functions such as load schedules, on/off times, real time clock, and day-of-week/month shall be built into the networkable intelligent control module.

2.6 SYSTEM SOFTWARE CAPABILITIES

Each networkable lighting control panelboard shall contain lighting control software as an integral part of the panelboard. The lighting control software shall be capable of providing the ability to control the lighting through menu-driven screens. The lighting application software shall meet or exceed the following:

- A. Manual Load Override Control shall be accomplished through the desktop operator's station keyboard. The operator may turn individual loads "on" and "off" or issue "all on" and "all off" commands to individual lighting control panelboards. A "locked load" priority status may be assigned to any of the system loads to prevent unauthorized manual control of critical items.
- B. Time/Event Scheduling - All loads shall be programmable with up to 12 "on" or "off" times per day. In addition to the normal 7 day weekly schedule, special day schedules shall allow the system to be programmed for holidays or special events. Programming shall be simplified through the use of "Copy Times" and "Copy Day" features.
- C. Holiday and Special Day Scheduling - In addition to the normal 7 day weekly schedule, three discrete holiday schedules shall allow the system to be programmed for holidays or special events. These holiday schedules shall be capable of being programmed for up to 5 occurrences each. Each occurrence shall be for up to fourteen days.
- D. The Softpatch feature shall allow any switch to be programmed to control any load or any group of loads in the system.
- E. Alarms-All - System alarms shall generate an audible and visual warning at the operator's station. A list of any current alarms pending shall be displayed. Hardware and software malfunctions shall be alarmed as well as any programmed alarm input point.
- F. The astronomical clock feature shall provide the ability to control loads "on" or "off" based on sunrise and sunset. The astronomical calculations shall be based on longitude, latitude and GMT offset. Selectable offsets of 0 to 120 minutes from sunrise/sunset may be programmed.
- G. Fixed/Adjustable Load Priority - The priority of any load shall be adjustable as with manual override or emergency lighting. Adjustable priorities are those that automatically adjust according to frequency of use or predefined program constraints.
- H. Remote Programming - Remote programming through modems and standard telephone lines shall allow all control and monitoring functions normally performed on the operator's station to be performed from a remote site. System schedules and load assignments may also be programmed as well as system hardware diagnostics.
- I. Hardware Diagnostics - The hardware status of all lighting control panelboards, including individual circuit boards, may be checked by the operator through the panel displays. Any malfunctions shall be highlighted allowing for quick and easy troubleshooting and servicing. Visual alarms shall be generated when hardware malfunctions occur.

- J. Programmable Input Configurations - The programmable input configurations shall allow each input of the lighting control panelboard to be user definable. There shall be 6 user definable input modes with any combination of modes acceptable.
1. Timed switch mode is used to replace a standard mechanical timer. Up to 599 minutes of delay may be selected.
 2. Interlocked switch mode is a momentary contact that activates a group of switches so that when one of the group is activated the other in the group may be turned off.
 3. Global mode is used when a maintained or momentary type input is required to control loads located in any lighting control panelboard on the network.
 4. Maintained input mode is used to turn loads on or off when the load is required to follow the switch action.
 5. Momentary input mode is used to toggle loads on or off.
 6. Alarm input mode will display an alarm message when the input is a closed, maintained contact. The alarm will clear when the contact is opened.
- K. Microsoft Windows Compatible - the lighting control software shall be designed to run as a MS Windows application and to dynamically share data with other application modules.

2.7 NETWORK SPECIFICATIONS

Each standalone networkable lighting control panel shall provide the ability to communicate through a suitable network control cable or optical fiber cable. Control connections (0-10VDC) to dimming ballasts shall be of suitably sized analogue control conductors with a minimum AWG of #12 for runs up to 1,400'. For runs over 1,400' installing contractor shall coordinate with lighting control system manufacturer for recommended minimum wire gauge. A self contained network shall provide a highly reliable communications bus for transferring data between lighting control panelboards. The network specifications shall meet or exceed the following:

- A. Self-powered - The dataline shall be self-powered from the networkable intelligent lighting control module. No external power supply shall be required. A UPS power backup system shall be provided for network control electronics.
- B. Fault Tolerant - Each networkable intelligent lighting control module shall have the ability to remove itself from the network should it have problems. Network "lock-ups" due to failed panelboards shall not be acceptable.

2.8 CENTRAL PROGRAMMING/MONITORING LIGHTING MANAGEMENT STATION

A. Description

1. Central monitoring and programming capability shall be added by plugging the lighting management station into the network.

2. The lighting management station shall function as the central data collection and programming terminal for the custom tailoring of lighting requirements. The lighting management station shall record and monitor vital system operations. Any data accumulated may be archived or used to generate standard reports.

B. Hardware Capabilities

1. The Lighting Management Station shall meet or exceed the following capabilities:
 - a. System Unit: Pentium class, 2.0GHz or better
 - b. Hard Drive: 200 GB
 - c. CDRW/DVD read/write Drive
 - d. RAM Memory: 2 GB
 - e. Monitor: 42" Flat Plasma Touch Screen
 - f. Printer Port: Parallel and USB 2.0
 - g. Serial Port: RS-232
 - h. Keyboard: Enhanced
 - i. Disk Operating System: Microsoft Windows 2000 or XP Professional
 - j. 6 USB 2.0 ports
 - k. Network Ethernet, Fast Ethernet
 - l. Transient Surge Suppression Devices
 - m. Ethernet Switch or Hub
 - n. UPS Backup System

2. Software

The Lighting Management Station standard software features shall meet or exceed the following capabilities:

- a. Screens – The central Lighting Management Station shall provide a graphically oriented touch screen man-machine interface that provides the ability to control lighting through user-friendly, graphic icon-driven screens. Screens shall provide ground plan view of areas being controlled, indicate current lighting status, and provide virtual controls allowing changes. A large plasma touch screen capable of displaying a park overview shall be provided.
- b. Microsoft Windows shall provide the graphically oriented, multi-application environment that gives the operator the ability to work with Application Specific Control Modules.
- c. DDE - Dynamic Data Exchange shall be provided to set up automatic links between Application Specific Control Software Modules (data sharing).
- d. Mouse - Provide hand operated pointing device for a consistent application interface.

2.9 AUXILIARY CONTROL DEVICES

- A. Indoor Photodiode Sensor: shall be capable of switching circuits on and off in response to the availability of natural daylight in the designated area.

1. The photoelectric device shall be a Class 2, low voltage, ambient light sensor designed to interface directly with the analog input of the controller [see below]. The sensor shall supply an analog signal to the controller system proportional to the light measured. The sensor shall be capable of a fully adjustable response in the range between 0 and 750 footcandles with a +/- 1% accuracy at 70 degrees F (21 degrees C).
 2. The sensitivity adjustment shall be remote at the controller. The sensor housing shall be flame retardant and meet UL 94 HB standards.
 3. Sensor shall have a Fresnel lens, with a 60 degree cone of response. Sensor shall only require a penetration hole in the ceiling of 3/8" diameter, and the sensor shall mount to the ceiling using appropriate mechanical fasteners.
 4. Photosensors to have all necessary calibration adjustments made at the controller.
 5. Installing contractor is responsible for calibrating the photosensor lighting operation under the direction of the Commissioner.
 6. Interconnect wiring between the photosensor and the lighting control system must be shown on the shop drawings.
- B. Outdoor Photodiode Sensor: shall be capable of initiating a lighting event in response to the availability of natural daylight in the designated area.
1. Photodiode sensor shall be powered from the lighting control panel. Events triggered by the photosensor can control any and all relays or dimmed circuits throughout the system. Events triggered can include recalling pre-programmed presets or initiate timed sequences.

The photoelectric device shall be a Class 2, low voltage, ambient light sensor designed to interface directly with the analog input of the controller [see below]. The sensor shall supply an analog signal to the controller system proportional to the light measured. The sensor shall be capable of a fully adjustable response in the range between 0 and 10,000 footcandles with a +/- 1% accuracy at 70 degrees F (21 degrees C).
 2. The sensitivity adjustment shall be remote at the controller. The sensor housing shall be outdoor rated.
 3. It shall be possible to program a 30 second input time delay to avoid false intermittent switching. Each setpoint shall have a fixed 10% "deadband". As the sensor [see above] detects a predetermined light level that corresponds with a setpoint, the controller shall initiate a lighting event.
 4. (14) "Rising" and (14) "Falling" trigger points shall be configurable for each photosensor.
 5. System shall be capable of operating in an open loop configuration.

2.10 SYSTEM DESIGN CRITERIA

- A.
 - 1. See electrical drawings for location of all panelboards and devices.
 - 2. The number of circuits and control groups, as well as type of control shall be as indicated on the electrical drawings. All controls shall be remote as described in the specifications.
- B. System shall consist of:
 - 1. Relay Panel
 - 2. Photocell
 - 3. Master Control Station
 - 4. Remote Station
 - 5. Programmable Time Switch (stand-alone)
- C. The system shall be designed to control the building's exterior and interior lighting fixtures and provide a link to BMS to monitor the status of each of the buildings lighting areas.

The following types of control will be required;

- 1. Salt Storage:
 - a. On-Off for fluorescent.
- 2. Exterior:
 - a. 1FL: Doorway light: Photocell On/ Astronomical timeclock Off
 - b. Façade Light: Doorway light: Photocell On/ Astronomical timeclock Off
- 3. Electrical Room:
 - a. On-Off for fluorescent

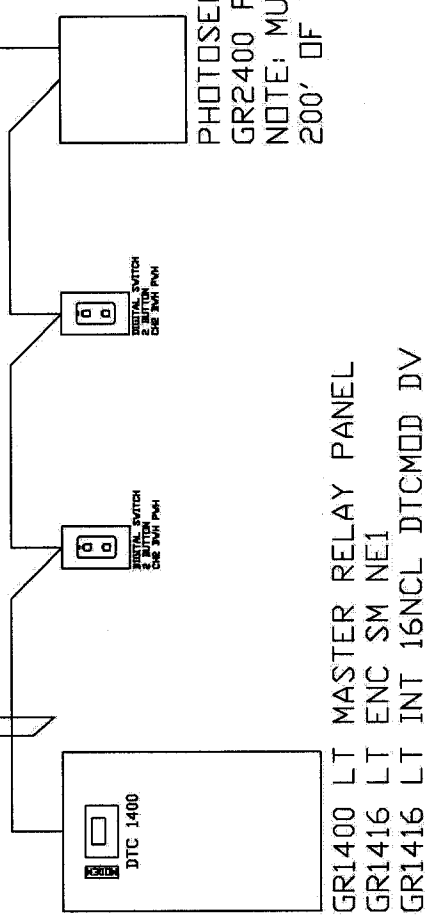
2.11 SALT SHED SINGLE LINE DIAGRAM

A. Lighting Control System Single Line Diagram [Exterior and Interior]:

Refer to Electrical Drawings for full size single line diagram and load schedule

CAT 5 PATCH CABLE
WITH RJ45 CONNECTORS
4,000 FT MAX IN 3/4"
CONDUIT

EXTERIOR PHOTOSENSOR
POLL 240
MOUNT ON ROOF, FACING
NORTH



GR1400 LT MASTER RELAY PANEL
GR1416 LT ENC SM NE1
GR1416 LT INT 16NCL DTCMOD DV

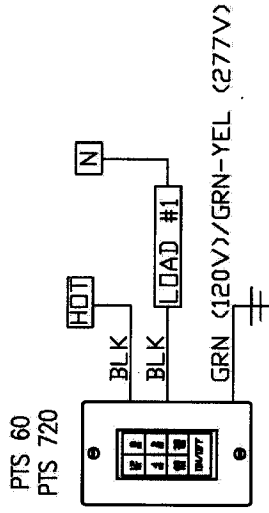
Note:

For information regarding emergency lighting systems and interface to UPS panel see riser diagram on Electrical drawings.
See electrical drawings for complete panelboard schedule and load information.

B. Electrical Room Lighting Control System Single Line Diagram:

Refer to Electrical Drawings for full size single line diagram and load schedule.

TYPICAL STAND-ALONE TIMER SWITCH FOR ELECTRICAL ROOM



Note:

For information regarding emergency lighting systems and interface to UPS panel see riser diagram on Electrical drawings. See electrical drawings for complete panelboard schedule and load information.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. **Delivery Storage Handling:** Deliver products to the job site in manufacturer's original containers marked with job name, Contractor's name and labeling that clearly indicates the contents. Deliver, store and handle products in accordance with manufacturer's written admonishments.
- B. **Job Conditions:** Maintain job site conditions in accordance with manufacturer's recommendations.
- C. **Reject and do not install any damaged or unsatisfactory equipment.** Replace unsatisfactory equipment with new equipment that is satisfactory if so directed by the City of New York or their representative.
- D. **The system shall be installed utilizing complete manufacturer's shop drawings and in accordance with these specifications.**
- E. **Install Control Stations only after "wet" work such as plastering and painting is complete and the area is cleaned.**
- F. **The breaker cabinets and controls shall be stored in their original cartons or crates in a dry location free from dirt and dust until ready to install. Provide protection and protective coverings as appropriate to prevent damage to the equipment during installation and until City of New York's acceptance. Repair or replace damaged equipment as directed.**
- G. **Mount equipment at locations and heights indicated on approved shop drawings, or as directed by City of New York. Locations indicated on the electrical drawings are general and approximate - carefully verify locations with Architect's plans prior to installation. Check for adequacy of headroom and clearance with other equipment such as ducts, pipes and openings. The installing contractor shall bring all conflicts to the City of New York's attention prior to proceeding with the work.**
- H. **Upon completion of the installation Contractor shall test all line voltage and control wiring for continuity and accuracy of all connections.**
- I. **Upon completion of the installation, the lighting control equipment shall operate per specifications and be free from defects in condition and finish. Moveable parts must operate freely and with uniform friction throughout their range. Any components damaged prior to the final inspection must be replaced by the Contractor prior to inspection.**
- J. **Contractor shall ensure that the factory start up engineer makes any calibrations and adjustments necessary for proper operation of the system.**

3.2 SYSTEM START-U

- A. **Upon completion of the installation, the system shall be checked out and started up by a factory trained technician. Contractor to have completed and tested all wiring, installed all controls and lamped all fixtures before start up.**

- B. Upon completion of system start up, the factory trained technician shall demonstrate the operation of the system to the Contractor and the City of New York's representative. Contractor to advise City of New York's representative prior to scheduling start up so all persons designated by the City of New York and Commissioner are present for training. [See Sect. 3.03] The following system start-up services shall be supplied by a factory trained Technician during a single site visit.
1. Check installation of all Lighting Control Panelboards
 2. Test operation of all Breakers and Lighting Breakers
 3. Test operation of all Low Voltage Inputs
 4. Test operation of all Telephone Override Lines
 5. Test operation of all Network Communication
 6. Test operation of Lighting or Building Management Station and Associated Printer
 7. Load Application Specific software Control Modules and test operation
 8. Repair or replace any defective component
 9. Test operation of complete Lighting or Building Management System
- C. Equipment manufacturer to provide six (6) bound copies of a "Maintenance and Operation Manual" to the City of New York's representative. Manuals shall contain "As Built" shop drawings, wiring diagrams, description of all control functions, all instruction sheets for all components, calibration and adjustment procedures for all applicable components, maintenance procedures and instructions, component specifications, copy of warranty and service contract (if applicable), address and phone contacts for troubleshooting and service help. Manufacturer's start up engineer to review contents of manual with City of New York's representative.
- D. The City of New York or his representative will schedule a final inspection with the Contractor. The Contractor will make any necessary adjustments and calibrations, whether the inspection is scheduled within or outside normal working hours, at no additional cost to the City of New York.
- E. If deficiencies that can be corrected immediately are apparent, correct them as soon as possible and schedule another final inspection with the City of New York. The Contractor will reimburse the Commissioner or his representative for his costs, including travel costs, to return for re-inspection. The Contractor will also bear costs of any additional inspections until the system is approved of system. System must be approved prior to City of New York's acceptance.

3.3 TRAINING

- A. Factory technician will schedule, in coordination with the City of New York, a training period for the City of New York's staff [min. 5 personnel] or designated appointees. This training period to be a minimum of 3 hours. Training to encompass entire scope of the system including operation, adjustment, maintenance and troubleshooting until completely understood. Manufacturer shall submit names and period of attendance of those instructed.
- B. The following system training services shall be supplied by a factory Field Commissioner during a single site visit:
1. System review of all Hardware Components and their functions

2. System review of all software Components and their function
3. Hands-On "Operator" training to develop experience with Supplied Control Functions
4. Hands-On "Building Commissioner" training to develop experience with system Software Programming
5. Walk through of User's Guide and Programmer's Guide

3.4 SYSTEM PROGRAMMING

The following system programming services shall be supplied by a factory Field Commissioner during a single site visit:

- A. Advise the Building Commissioner on developing a control scenario for each application
- B. Program the Building Commissioner supplied control scenario into the lighting management system
- C. Review the programmed information with the Building Commissioner and walk through the operation of the program
- D. Provide program on 3.5" diskette

3.5 DOCUMENTATION

The following documentation shall be supplied:

- A. System Single-Line Diagram: show system components and quantities including panelboards, breakers, low-voltage switches and sensors, dataline, telephone override lines and Lighting or Building Management Station.
- B. Panelboard Configuration Diagram: Show PC board configuration, breaker configuration and power supply location.
- C. Panelboard Wiring Schedule: Show breaker/load relationship with direct switch override if applicable.
- D. Wiring Diagram: Show typical wiring application diagram for each system component supplied.
- E. Installation Guide: Provide instructions as to how to install system components.
- F. Manual: Provide User's Guide and Programmer's Guide in a loose leaf three ring binder with step by step illustrated instructions.
- G. Riser Diagram: Provided by specifier along with reflected ceiling plans showing control schematic.

END OF SECTION 16600

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APPENDIX #1 FIXTURE SCHEDULE

Electrical Contractor and Equipment Suppliers please note:

Throughout the bidding, submittals, and construction phases of the project, the information requirements and instructions identified in Parts 1, 2, 3 of Section 16500 shall be adhered to as if included in the following lighting equipment schedules. All information including in the details, layouts, schedules and specifications shall be considered to form a complete and integrated specification for lighting equipment.

INTERIOR LIGHTING

- S1. DESCRIPTION** : Surface mounted 14.625" wide x 6.05" high x 4'-0" long 4-lamp 54 watt T5HO fluorescent industrial downlight lensed luminaire with dual switch. [See detail EL101]
- LAMP** : **Switch Leg #1:** (2) FP54/841/HO/XL/ECO [SYLVANIA] (5,000 lumens)
Switch Leg #2: (2) FP54/841/HO/XL/ECO [SYLVANIA] (5,000 lumens)
- OPTICS** : Provide with clear acrylic high impact lens . Upper reflector shall be constructed of aluminum with high gloss polyester powder coat white enamel finish. Minimum reflectivity: 90%. Spacing to mounting height ratio shall be 1:1.2 with a minimum total operating efficiency of 85%.
- REMARKS/LOCATION** : **Salt Storage:** Luminaire housing shall be fabricated from fiberglass reinforced polyester. Provide stainless steel cam latches hold diffuser tightly for a positive seal between housing, gasketing and diffuser. All external surfaces are painted white. Entire luminaire assembly shall be UL listed for outdoor wet locations (minimum IP rating of 67) and shall bear an IBEW label. Provide one junction box per fixture run. Fixture shall be controlled via local switch. All hardware and fasteners to be stainless steel. Contractor shall provide and coordinate all requisite support and hardware for safe and proper installation.
- BALLAST** : Provide with (2) two integral solid-state, 265 mA 20khz 2-lamp, rapid start electronic ballast. Ballasts shall be Type A sound rated, Class P, and suitable for operation at 120/277 volts. Minimum ballast factor: 1.0.
- APPROVED MANUFACTURER** : **Metalux #VT4-4-54T5-M-DR-277V-EBT2-WL** or or approved equal by Fail Safe, or others.

-
- S2. DESCRIPTION** : Surface mounted 4.5" wide x 4.13" high x 4'-0" long 1-lamp 54 watt T5HO fluorescent direct downlight lensed luminaire. [See detail EL101]
- LAMP** : (1) FP54/841/HO/XL/ECO [SYLVANIA] (5,000 lumens)
- OPTICS** : Provide with optically clear injection molded acrylic lens .
- REMARKS/LOCATION** : **Electrical Room:** Luminaire housing shall be fabricated from one-piece impact resistant fiberglass reinforced polyester. All external surfaces and flange to be polyester powder coat white enamel finish. Entire luminaire assembly shall be UL listed for outdoor wet locations (minimum IP rating of 67) and shall bear an IBEW label. Provide one junction box per fixture location. Fixture shall be controlled via local time switch. All hardware and fasteners to be stainless steel. Contractor shall provide and coordinate all requisite support and hardware for safe and proper installation.
- BALLAST** : Provide with one integral solid-state, 265 mA 20khz 1-lamp, rapid start electronic ballast. Ballasts shall be Type A sound rated, Class P, and suitable for operation at 120/277 volts. Minimum ballast factor: 1.0.
- APPROVED MANUFACTURER** : LaMar Lighting #DV-1-54-E5-U-PC-HF-OC or or approved equal by Metalux, or others.

EXTERIOR LIGHTING

- SX1. DESCRIPTION** : Ingrade mounted 4.33" wide x 3.9" high x 4'-0" long 1-lamp 54w T5HO fluorescent lensed luminaire with asymmetrical distribution. [See Details EL102]
- LAMP** : (1) FP54/841/HO/XL/ECO [SYLVANIA] (5,000 lumens)
- OPTICS** : Provide with high heat, shock resistant tempered 1/4" borosilicate flat glass lens set in 1/2" stainless steel faceplate, suitable for drive-over applications. Lens shall be "cool touch". Surface shall be prepared with a slip resistant surface.
- REMARKS/LOCATION** : **Exterior Facade:** Fixture housing to be comprised of continuous 6063-T6 extruded aluminum profile up to 4 feet long with die cast aluminum end caps. External flange to be white semi-gloss polyester powder coat enamel per ~~Architect's~~ Commissioner's color chip. Nominal 4.33" wide x 3.9" high x 4'-0" long watertight housing with polyurethane gasketing providing a continuous seal with 6 study cam latches for positive seal between housing, gasketing, and diffuser. All hardware and fasteners to be stainless steel. Entire luminaire assembly shall be UL listed for outdoor wet locations (minimum IP rating of 68) and shall bear an IBEW label. Provide one junction box per fixture location. Fixture shall be controlled via photocell and astronomical time clock. Contractor shall provide and coordinate all requisite support and hardware for safe and proper installation.
- BALLAST** : Provide with an integral solid-state, 265 mA 20khz, 1-lamp, electronic ballast. Provide cold weather ballast, ballast should be suitable for operation at -20°F/-29°C. Ballasts shall be Type A sound rated, Class P, and suitable for operation at 120 volts. Minimum ballast factor: 1.0.
- APPROVED MANUFACTURER** : **Designplan #C5L-8-08-4-SS-0-C-T-00** or approved equal by Winona, or others.

- SX2. DESCRIPTION** : Continuous surface mounted 5" wide x 3.5" high x 4'-0" long 2-lamp 54w T5HO fluorescent lensed luminaire with symmetrical distribution. [See Detail EL102]
- LAMP** : (2) FP54/841/HO/XL/ECO [SYLVANIA] (5,000 lumens)
- OPTICS** : Provide with satine inlay and tempered clear glass lens. Upper steel reflector shall be constructed of code gauge cold rolled steel treated with high gloss powder coat white enamel finish [min. reflectivity: 90%.] Total efficiency shall be in excess of 70%. Spacing Criteria: 1.2 (0°-180°); 1.16 (90°-270°); 1.22 (Diagonal).
- REMARKS/LOCATION** : **Vehicle Entry (see plan):** Fixture housing to be comprised of continuous 6063-T6 extruded aluminum profile up to 4 feet long with die cast aluminum end caps. External surfaces and flange to be polyester powder coat enamel per Architect's-Commissioner's color chip. Provide with stainless steel hardware. Entire luminaire assembly shall be UL listed for outdoor wet locations (minimum IP rating of 66) and shall bear an IBEW label. Provide one junction box per fixture run. Fixture shall be controlled via photocell and astronomical time clock. Installing contractor and manufacturer shall field verify run lengths prior to release for fabrication. Contractor shall provide and coordinate all requisite support and hardware for safe and proper installation.
- BALLAST** : Provide with integral tandem (master/slave) solid-state instant start electronic 2-lamp 265 mA 277 volt ballast. Provide cold weather ballast, ballast should be suitable for operation at -20°F/-29°C. Ballast shall be class P, type A rated. Minimum ballast factor: 1.0.
- APPROVED MANUFACTURER** : **SELUX #M125-2T5HO-SI-PC-F-004-FINISH PER ARCHITECT-277-CW** or approved equal by Forum, Apogee, Icon or others.

END OF APPENDIX #1

**GEOTECHNICAL REPORT
FOR
SPRING STREET SALT SHED
BOROUGH OF MANHATTAN, NEW YORK**

**DDC Project No. S195-227S
SES No. 4050
Work Order No. 9041-CDM-8543
Contract Registration No. 2012008687**

Prepared for:



**Division of Safety and Site Support
Bureau of Environmental and Geotechnical Services
30-30 Thomson Avenue
Long Island City, NY 11101**

Prepared by:
Camp Dresser and McKee
14 Wall Street, Suite 1702
New York, NY, 10005

July 16, 2013

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FIGURE

FIGURE 1 – Site Location Plan

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APPENDIX E – Project Calculations



EXECUTIVE SUMMARY

At the request of the New York City Department of Design and Construction Bureau of Environmental and Geotechnical Services, hereafter "NYCDDC", Camp Dresser and McKee (CDM Smith), prepared this geotechnical report presenting the summary of existing geotechnical data previously collected by others, results of the subsurface exploration program and geotechnical evaluations and recommendations for the proposed salt shed storage structure, in Manhattan, New York, hereafter "the Site". CDM Smith reviewed the existing geotechnical data provided by NYCDDC, provided oversight of the subsurface exploration program and performed the engineering evaluations under CDM Smith's task order contract with the NYCDDC for Geotechnical Engineering Services for Various Projects. Subsequent to contract registration with NYCDDC, CDM acquired Wilbur Smith and changed the company name to CDM Smith.

The Site is the location of the existing DSNY District 1 Garage, in Manhattan, New York. The Site is located approximately 250 feet east of the Hudson River south of Spring Street and north of Canal Street. The Site is west of Washington Street and east of West Street. The current structure abuts the Holland Tunnel Ventilation Shaft Building to the east. The eastbound and westbound tubes of the Port Authority of New York and New Jersey Holland Tunnel are below Canal Street and Spring Street, respectively. The planned construction includes an at-grade salt shed storage structure approximately 7,600 square feet in plan area and a yard area approximately 2,400 square feet in plan area. It is our understanding that floor loads will range from 1,950 psf to 3,550 psf and that micro-caisson foundations with 200 to 300 ton compression, 100 to 150 ton uplift, and 5.0 ton lateral capacity will be required. No raise in site grades has been assumed.

CDM Smith reviewed the following existing geotechnical data related documents:

- Geotechnical Engineering Report, Manhattan District 1/2/5 Garage, New York, New York, New York City Department of Sanitation, prepared by Langan Engineering, and Environmental Services.
- Key Geotechnical Aspects Memorandum, Spring Street Salt Shed ("The Project"), New York, New York, Langan Project No.: 170139001, prepared by Langan Engineering, and Environmental Services, dated February 12, 2013.
- Demolition of Existing District 1 Garage Drawings, prepared by URS for The City of New York Department of Sanitation, dated August 19, 2009.
- The Holland Tunnel, Contract No. 13, Contract Drawing No. 20, prepared by New York State Bridge and Tunnel Commission and New Jersey Interstate Bridge and Tunnel Commission, dated August 4, 1925.



- Contract Drawings prepared by New York City Department of Design and Construction for the Spring Street Salt Shed.

For the subsurface exploration program in June, 2013, CDM Smith provided oversight of four (4) borings that were terminated at depths ranging from 116 to 123 feet below ground surface (bgs). The subsurface soils encountered in the boring can be described by the following stratigraphy:

- **Fill:** Fill, composed primarily of fine to coarse Sand, with varying amounts of gravel, silt, boulders, cobble, concrete fragments, bricks, and brick fragments. The Fill ranged in thickness at the subsurface exploration locations from 14 to 25 feet. (New York City Building Code (Code) Class of Material: 7).
- **Silt and Clay:** Silt and Clay, composed primarily of Silt and Clay, varying amounts of fine to medium sand, trace gravel, trace organics, and noted to be slightly micaceous. The top of this stratum was encountered at a depth that ranged from approximately 17 to 25 feet bgs (El. -11.7 and El. -19.7) and the thickness of the stratum is approximately 13.5 and 26.5 feet. (Code Classes of Material: 5b and 6).
- **Clayey Silt 1:** Clayey Silt 1, composed primarily of Clayey Silt, varying amounts of fine to medium sand, trace gravel, trace organics, and noted to be slightly micaceous. The top of this stratum was encountered at a depth that ranged from approximately 14 to 38.5 feet bgs (El. -8.7 and El. -33.2) and the thickness of the stratum is approximately 10 and 39.5 feet. (Code Classes of Material: 5b and 6).
- **Sand and Silt:** Sand and Silt, composed primarily of fine to medium Sand, varying amounts of silt, and noted to be slightly micaceous. The top of this stratum was encountered at a depth that ranged from approximately 38.5 to 48.5 feet bgs (El. -33.2 and El. -43.2) and the thickness of the stratum is approximately 5 and 20 feet. (Code Class of Material: 3b).
- **Clayey Silt 2:** Clayey Silt 2, composed primarily of Clayey Silt, trace fine to medium sand, trace gravel, and noted to be slightly to very micaceous. The top of this stratum was encountered at a depth that ranged from approximately 48.5 to 63.5 feet bgs (El. -43.2 and El. -58.2) and the thickness of the stratum is approximately 5 and 27.5 feet. (Code Class of Material: 5b).
- **Sand:** Sand, composed primarily of fine to coarse Sand, varying amounts of silt, and trace gravel. The top of this stratum was encountered at a depth that ranged from approximately 63.5 and 81 feet bgs (El. -58.2 and El. -75.7) and the thickness of the stratum is approximately 15 to 25.5 feet. (Code Classes of Material: 3a and 3b).



- **Decomposed Rock:** Decomposed Rock, composed primarily of residual soil consisting of Clayey Silt and fine to medium Sand, little gravel, and included mica flakes. The top of this stratum was encountered at a depth that ranged from approximately 91 to 99 feet bgs (El. -85.7 and El. -93.7) and the thickness of the stratum is approximately 4 to 8.5 feet. (Code Class of Material: 1d).
- **Bedrock:** Bedrock generally consisted of slightly weathered, fine to medium grained, schist to gneissic schist, with recovery percent ranging from 67% to 100% with an average recovery of about 98%. RQD values ranged from 13% to 100% percent with an average RQD of about 92%. The top of this stratum was encountered from 96 to 101 feet bgs (El. -90.7 to El. -95.7). (Code Classes of Material: 1a, 1b, and 1d).

One groundwater monitoring well was installed in the recent exploration, B-1, which had 10 feet of well screen with the bottom of screen set about 19 feet bgs. In this well, groundwater was measured at a depth 7.9 feet bgs (El. -2.6). Elevations are referenced to the Borough President of Manhattan Datum (BPMD).

Based on the review of the existing geotechnical data, recent subsurface exploration program, laboratory testing, geotechnical engineering evaluation, and our current understanding of the proposed project requirements, deep foundation systems consisting of micro-caissons were evaluated for support of the proposed structure. The capacity of the micro-caissons will be derived from rock sockets installed into the underlying bedrock. A range of caisson capacities, diameters, and socket lengths are presented in Section 8 of the report. The bottom of micro-caisson cap should be at least 4.0 feet bgs to reduce the susceptibility of frost damage.

Groundwater levels are anticipated to be below the first floor level. The FEMA Flood Insurance Rate Map shows the Site to be located in a Flood Hazard Area – Zone AE, within the 100-year flood zone of the Hudson River. An underslab drainage system is not recommended.

The potential for liquefaction has been evaluated and the site is not considered liquefaction susceptible. In addition, a Seismic Site Class D is recommended.

No soil corrosivity testing data was conducted as part of the current scope of work.



1.0 INTRODUCTION

At the request of the New York City Department of Design and Construction Bureau of Environmental and Geotechnical Services, hereafter "NYCDDC", CDM Smith, prepared this geotechnical report presenting the summary of existing geotechnical data previously collected by others, results of the subsurface exploration program and geotechnical evaluations and recommendations for the proposed salt shed storage structure at the existing City of New York Department of Sanitation, hereafter "DSNY" District 1 Garage at 553 Canal Street, in Manhattan, New York, hereafter "the Site". CDM Smith reviewed the existing geotechnical data and 90 percent drawings titled "New York City Department of Sanitation, Spring Street Salt Shed" prepared by NYCDDC, dated April 22, 2013 provided by NYCDDC, provided oversight of the subsurface exploration program and performed the engineering evaluations under CDM Smith's task order contract with the NYCDDC for Geotechnical Engineering Services for Various Projects.

2.0 PROJECT DESCRIPTION

The Site location is at the existing DSNY District 1 Garage, in Manhattan, New York. The Site is located approximately 250 feet east of the Hudson River south of Spring Street and north of Canal Street. The Site is west of Washington Street and east of West Street. The current structure abuts the Holland Tunnel Ventilation Shaft Building to the east. The eastbound and westbound tubes of the Port Authority of New York and New Jersey, hereafter "PANYNJ" Holland Tunnel are below Canal Street and Spring Street, respectively. The location of the Site is shown on Figure 1.

Based on the discussion with NYCDDC the proposed construction includes the following:

- An at-grade, salt shed storage structure, approximately 7,600 square feet in plan area.
- Floor loads are anticipated to be 1950 psf to 3550 psf.
- Wall loads are anticipated to be 81 kips per linear foot (klf).
- No raise in site grades has been assumed.

3.0 PREVIOUS INVESTIGATION

Two previous subsurface investigation programs were authorized by DSNY at the adjacent site of the 1/2/5 Garage. The geotechnical data from both investigation programs were provided by NYCDDC to CDM Smith for review and evaluation. The report and drawings from the two previous investigation programs are listed below:

- Geotechnical Engineering Report, Manhattan District 1/2/5 Garage, New York, New York, New York City Department of Sanitation, prepared by Langan Engineering, and Environmental Services, hereafter “Langan”.

An investigation program was conducted between July and August 1998 and the program consisted of four (4) borings drilled and sampled to depths ranging from 97 to 108 feet below ground surface (bgs). A second investigation program was conducted between December 2007 and February 2008 and consisted of forty-eight (48) borings drilled and sampled to depths ranging from 98.5 to 125 feet bgs. Laboratory testing was conducted on representative Standard Penetration Test (SPT) soil samples. Twenty-four (24) Classification Tests (Gradation, Atterberg Limits, USCS classification) and twenty-four (24) moisture content were performed on SPT samples. A copy of the relevant soil borings logs is included in Appendix A.

4.0 PURPOSE AND SCOPE OF WORK

Based on Task ID # 9041, four (4) test borings were proposed to explore the subsurface conditions within the footprint of the planned salt shed storage structure and to develop geotechnical recommendations for the design and construction of the planned facility in accordance with the NYC Building Code (Code).

CDM Smith’s scope of work included review of existing geotechnical data, oversight of four (4) test borings up to 123 feet deep and one (1) monitoring well and preparation of a geotechnical laboratory testing program. In addition, the scope of work included evaluation of the impact of the subsurface conditions on the planned construction and preparation of this Geotechnical Report.

CDM Smith prepared a Record of Boring in accordance with the NYCDDC procedures and guidelines. The Record of Boring includes a boring location plan, log of the borings, a table summarizing the results of the laboratory testing, and the measured depth to the groundwater surface in the installed monitoring well. A separate report presenting the results of the laboratory testing was also prepared. A copy of the Record of Boring is included in Appendix C. A copy of the results of the laboratory testing is included in Appendix D.

5.0 SITE CONDITIONS AND REGIONAL GEOLOGY

The site is located between the eastbound and westbound tubes of the PANYNJ Holland Tunnel along West Street. The tunnel structures are approximately 40 to 60 feet below the existing sidewalk grades. An active construction site is located to the north of the



proposed structure. The lot size of the Site is approximately 10,000 square feet and is completely occupied by the existing one-story brick DSNY District 1 Garage. Existing site grades range from about El. 5.0 to 7.0. The existing garage structure is understood to be supported on shallow spread footing foundations with a slab on grade. The structure, including all foundation elements are to be removed and any excavations backfilled with granular fill prior to the salt shed construction. All elevations are based upon the Borough President of Manhattan Datum (BPMD).

The Site is located within the regional geological Manhattan Prong of the New England physiographic province. At the Site, alluvial sediments consisting of silts and fine sands from the Holocene Epoch overlay Pleistocene (glacial outwash) sediments consisting of sands, silts, and lake clays from the glacial melt waters that overlay decomposed rock and bedrock. The bedrock at the project site is Manhattan Schist, a fine to coarse grained metamorphic rock composed of quartz, oligoclase, microcline, biotite, and muscovite. Based on geology maps of the area, the depth of the bedrock in the vicinity of the Site is approximately 100 feet below ground surface.

6.0 METHOD OF SUBSURFACE EXPLORATION

Under the current scope of work four (4) test borings were conducted to depths between 116 to 123 feet bgs. Bedrock was encountered at all test boring locations. The test borings were drilled and sampled between June 10 and June 18, 2013. The drilling, soil sampling, and rock coring were performed by Aquifer Drilling and Testing, Inc hereafter ADT, of Mineola, New York under a separate direct contract with the NYCDDC.

ADT used vacuum excavation methods to clear the boring locations to a depth of six (6) feet bgs at the borehole location to avoid hitting potential subsurface utilities. ADT advanced the test borings with a track-mounted drill rigs to depths between 116 and 123 feet bgs by mud rotary drilling methods. Four-inch inside diameter (I.D.) steel casing was seated at the top of the borehole to facilitate drilling, which was retrieved upon completion of drilling. The four-inch steel casing was installed to depths between 20 and 22 feet bgs. Three-inch I.D. steel casing was installed and seated in the top of bedrock to facilitate rock coring at prevent water loss. The three-inch steel casing was installed to depth between 96 and 100 feet bgs. The location of the boring is shown on the Record of Boring in Appendix C.

Soil samples were collected starting from the bottom of vacuum excavated zone and were collected continuously in the upper ten (10) feet and at five-foot intervals until top of bedrock was encountered. Standard Penetration Testing (SPT) was conducted in accordance with *ASTM D-1586, Standard Method for Penetration Test and Split-Barrel*



Sampling of Soils. The soil samples in the boring were collected with a standard 2-inch diameter split spoon sampler. An automatic hammer was used to advance the split spoon sampler. The log of the boring is presented on the Record of Borings included in Appendix C.

The test borings were advanced under the full time observation of CDM Smith's field engineer (supplemental inspector), who recorded blow counts on the split spoon sampler, described the subsurface materials recovered in the sampler, and collected soil samples. CDM Smith's field engineer retained selected samples for possible laboratory testing.

One observation well was installed in Boring B-1(OW) at the completion of sampling to a depth of 19 feet bgs. The well was constructed with Schedule 40, 20 slot screen 2-inch diameter PVC with ten feet of well screen at the bottom and solid riser pipe to two feet above the existing floor surface. Well screen was set across the anticipated groundwater table. The annulus around the well screen was backfilled with sand, and the riser pipe was sealed with low permeability material.

A CDM Smith geotechnical engineer reviewed the field logs and prepared a laboratory testing program. The soil testing program included the determination of grain size distribution, Atterberg limits, and moisture contents on selected soil samples and Uniaxial Compressive Strength, Abrasion, and Point Load testing on selected rock core samples to confirm field descriptions, aid in the classification of the soils, and estimate engineering properties. The soil sample testing was performed by CDM Smith's geotechnical soil testing laboratory in Somerville, Massachusetts. The rock sample testing was performed by GeoTesting Express, Inc. of Acton, Massachusetts. Laboratory test results performed on the soil samples is presented in Appendix D.

7.0 RESULTS OF SUBSURFACE EXPLORATION AND TESTING

The subsurface soils encountered in the boring from the recent subsurface exploration program can be described by the following strata: Fill; Silt and Clay; Clayey Silt 1; Sand and Silt; Clayey Silt 2; Sand; Decomposed Rock; and Bedrock.

Fill

Fill stratum was encountered at all of the recent test boring locations and typically consisted of fine to coarse Sand, with varying amounts of gravel, silt, boulders, cobbles, and concrete and brick fragments. The average SPT N-value (the sum of the SPT values for the 6 to 12 inches and 12 to 18 inches intervals that the standard split spoon sampler was driven by a 140 pound hammer falling 30 inches) at the test boring locations was about 6 blows per foot, indicating that the fill material is generally loose. The Fill ranged



in thickness at the subsurface exploration locations from 14 to 25 feet. Based on the soil and rock classification system of the Code, the material is considered to be Class 7, Controlled and Uncontrolled Fill.

Laboratory testing was performed on four (4) samples collected from this stratum at the test borings locations to determine moisture content and grain size distribution. The moisture content of the tested samples ranged from 15.2% to 21.3%. For the tested samples the amount of material between the No. 4 sieve and No. 200 sieve, or amount of sand, ranged from 56.3% to 87.1% by weight. For the tested samples the amount of material retained on the No. 4 sieve, or amount of gravel size particles, ranged from 0.2% to 11.7% by weight, and the amount of material passing the No. 200 sieve, or amount of fines, ranged from 10.0% to 32.0%.

Silt and Clay

Beneath the Fill, a stratum of Silt and Clay was encountered at test boring locations B-1, B-2, and B-4. The soils of this stratum typically include Silt and Clay, varying amounts of fine to medium sand, trace gravel, trace organics, and were noted to be slightly micaceous. The average SPT N-value at the test boring locations was about 10 blows per foot, indicating the material is stiff. The top of this stratum was encountered at a depth that ranged from approximately 17 to 25 feet bgs (El. -11.7 and El. -19.7) and the thickness of the stratum is approximately 13.5 and 26.5 feet at the test boring locations. According to the Code, the soil of this stratum falls under the following classes of material: Class 5b, Medium Silts and Clayey Silts; and Class 6, Loose Silts and Clayey Silts.

Laboratory testing was performed on five (5) samples collected from this stratum at the test borings locations to determine moisture content, Atterberg limits and organic content. The moisture content of the tested samples ranged from 28.1% to 32.5%. The liquid limit of the test samples ranged from 23% to 26% and the plastic limit from 16% to 18%. The organic content of the tests samples ranged from 0.5% to 0.8% by weight

Clayey Silt 1

Beneath the Silt and Clay, a stratum of Clayey Silt was encountered at test boring locations B-1 and B-3. The soils of this stratum typically include Clayey Silt, varying amounts of fine to medium sand, trace gravel, trace organics, and were noted to be slightly micaceous. The average SPT N-value at the test boring locations was about 11 blows per foot, indicating the material is stiff. The top of this stratum was encountered at a depth that ranged from approximately 14 to 38.5 feet bgs (El. -8.7 and El. -33.2) and the thickness of the stratum is approximately 10 and 39.5 feet at the test boring locations.



According to the Code, the soil of this stratum falls under the following classes of material: Class 5b, Medium Silts and Clayey Silts; and Class 6, Loose Silts and Clayey Silts.

Laboratory testing was performed on one (1) sample collected from this stratum at the test borings locations to determine moisture content and grain size distribution. The moisture content of the tested sample was 29.8%. For the tested sample the amount of material between the No. 4 sieve and No. 200 sieve, or amount of sand, was 13.7% by weight. For the tested sample the amount of material retained on the No. 4 sieve, or amount of gravel size particles, is 0.0% by weight, and the amount of material passing the No. 200 sieve, or amount of fines, is 86.3%.

Sand and Silt

Beneath the Clayey Silt 1 stratum, a stratum of Sand and Silt was encountered at all of the recent test boring locations. The soils of this stratum typically include fine to medium Sand, varying amounts of silt, and were noted to be slightly micaceous. The average SPT N-value at the test boring locations was about 18 blows per foot, indicating the material is medium dense. The top of this stratum was encountered at a depth that ranged from approximately 38.5 to 48.5 feet bgs (El. -33.2 and El. -43.2) and the thickness of the stratum is approximately 5 and 20 feet at the test boring locations. According to the Code, the soil of this stratum falls under the following classes of material: Class 3b, Medium Granular Soils.

Laboratory testing was performed on two (2) samples collected from this stratum at the test borings locations to determine the moisture content and grain size distribution. The moisture contents of the tested samples ranged from 25.1% to 26.2%. For the tested sample the amount of material between the No. 4 sieve and No. 200 sieve, or amount of sand, ranged from 44.1% to 72.0% by weight. For the tested samples the amount of material retained on the No. 4 sieve, or amount of gravel size particles, ranged from 0.0% to 14.6% and the amount of material passing the No. 200 sieve, or amount of fines, ranged from 28.0% to 41.3%.

Clayey Silt 2

Beneath the Sand and Silt, a second stratum of Clayey Silt was encountered at all of the recent test boring locations. The soils of this stratum typically include Clayey Silt, trace fine to medium sand, trace gravel, and were noted to be slightly to very micaceous. The average SPT N-value at the test boring locations was about 20 blows per foot, indicating the material is very stiff. The top of this stratum was encountered at a depth that ranged from approximately 48.5 to 63.5 feet bgs (El. -43.2 and El. -58.2) and the thickness of the



stratum is approximately 5 and 27.5 feet at the test boring locations. According to the Code, the soil of this stratum falls under the following classes of material: Class 5b, Medium Silts and Clayey Silts.

Laboratory testing was performed on two (2) samples collected from this stratum at the test borings locations to determine moisture content and Atterberg limits. The moisture contents of the tested samples ranged from 26.4% to 28.4%. The liquid limit of the test samples ranged from Non-Viscous to 25% and the plastic limit from Non-plastic to 20%.

Sand

Beneath the Clayey Silt 2 stratum, a Sand stratum was encountered at all of the recent test boring locations. The soils of this stratum typically include fine to coarse Sand, varying amounts of silt, and trace gravel. The average SPT N-value at the test boring locations was about 38 blows per foot, indicating the material is dense. The top of this stratum was encountered at a depth that ranged from approximately 63.5 and 81 feet bgs (El. -58.2 and El. -75.7) and the thickness of the stratum is approximately 15 to 25.5 feet at the test boring locations. According to the Code, the soil of this stratum falls under the following classes of material: Class 3b, Medium Granular Soils; and Class 3a, Dense Granular Soils.

Laboratory testing was performed on four (4) samples collected from this stratum at the test borings locations to determine the moisture content, grain size distribution and Atterberg limits. The moisture content of the tested samples ranged from 14.5% to 25.3%. For the tested samples the amount of material between the No. 4 sieve and No. 200 sieve, or amount of sand, ranged from 62.7% to 90.4% by weight. For the tested samples the amount of material retained on the No. 4 sieve, or amount of gravel size particles, ranged from 0.0% to 1.3% and the amount of material passing the No. 200 sieve, or amount of fines, ranged from 8.3% to 37.3%.

Decomposed Rock

Beneath the Sand, a Decomposed Rock stratum was encountered at all of the recent test boring locations. The Decomposed Rock was residual soil composed primarily of Clayey Silt and fine to medium Sand, little gravel, and included mica flakes. The top of this stratum was encountered at a depth that ranged from approximately 91 to 99 feet bgs (El. -85.7 and El. -93.7) and the thickness of the stratum is approximately 4 to 8.5 feet at the test borings locations. The average SPT N-value at the test borings locations was 55 blows per foot, indicating that the material is very dense. According to the Code, the soil of this stratum falls under the following class of material: Class 1d, Soft Rock – Weathered Rock.

Laboratory testing was performed on one (1) sample collected from this stratum at the test borings locations to determine moisture content and grain size distribution. The moisture content of the tested sample was 9.7%. For the tested sample the amount of material between the No. 4 sieve and No. 200 sieve, or amount of sand, was 79.9% by weight. The amount of material retained on the No. 4 sieve, or amount of gravel size particles, was 7.8% and the amount of material passing the No. 200 sieve, or amount of fines, was 12.3%.

Bedrock

All four (4) of the test borings, penetrated into the underlying bedrock stratum. At each test boring location a minimum of 20 foot core run was conducted. The top of this stratum was encountered from 96 feet bgs at B-2 to 101 feet bgs at B-1. The top of the bedrock ranged in elevation from approximately El. -90.7 to El. -95.7. At the test boring locations the bedrock generally consisted of fresh to decomposed, fine to medium grained, schist to gneissic schist, with recovery typically ranging from 88% to 100% with an average recovery of about 98%. Rock Quality Designation (RQD) values typically ranged from 57% to 100% percent with an average RQD of about 92%. Extremely fractured bedrock was encountered at test boring B-3 from 104.5 to 109.5 feet bgs (El. -99.2 to El. -104.2) resulting in a recovery of 0% and a RQD value of 0%, and from 119.5 to 122.5 feet bgs (El. -114.2 to El. -117.2) resulting in a recovery of 67% and a RQD of 13%. At the test boring locations joints in the rock ranged from 0 to 80 degrees from the horizontal and the orientation of the foliation ranged from 60 to 90 degrees from the horizontal. According to the Code, the bedrock of this stratum falls under the class of material: Class 1b, Medium Hard Rock; and Class 1a, Hard Sound Rock except at B-3, R-2 where the bedrock is Class 1d, Soft Rock – Weathered Rock.

Laboratory testing was performed on twelve (12) rock core samples collected from this stratum at the test borings locations to determine unconfined compressive strength and abrasiveness. Twelve (12) unconfined compressive strength tests were conducted in accordance with ASTM D7112 Method C on core specimens collected at the test boring locations. The unconfined compressive strength of the specimens ranged between 1,440 and 15,786 pounds per square inch (psi) with an average strength of 7,848 psi. Four (4) abrasion tests were conducted in accordance with ASTM D7625 on core specimens collected from each of the recent test borings. The CERCHAR Abrasiveness Index (CAI) of the specimens ranged between 3.59 and 4.68 with an average of 4.38. Two (2) point load tests were conducted in accordance with ASTM D5731 on core specimens collected from test borings B-2 and B-3. The size corrected point load strength index calculated from the point load tests ranged between 105 and 481 psi with an average of 293 psi. The



estimated compressive strength from the point load testing ranged between 2,410 and 11,000 psi with an average of 6,705 psi. The ratio between the strength measured from the unconfined compressive strength test and point load test was 9.7 for the rock core sample from test boring B-2. The strength ratio could not be calculated for the rock core sample from test boring B-3 as the sample broke during preparation for the unconfined compressive strength testing.

Groundwater

The water level in the observation well (Boring B-1(OW)) installed for the recent subsurface exploration in June 2013, which had the well screen set between about 19.0 and 9.0 feet bgs, was measured at depth of 7.9 feet bgs which refers to El. -2.6 (BPMD).

Water levels measured in the observation well from the recent subsurface exploration program by CDM Smith are shown on the Record of Borings included in Appendix C. Water levels are anticipated to vary with tides, precipitation, and other climatic factors.

Water levels measured in the explorations should not necessarily be considered to represent stabilized groundwater levels. Water levels can also vary by plan location and depth/strata where measured as compared to the water level measured in the observation well installed at B-1. In addition, water levels are expected to change with time, season, temperature, tide, and construction activities in the area, as well as other factors. Groundwater conditions at the time of construction may be different from those found in explorations.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The results of our geotechnical evaluation and recommendations for the design and construction of the foundations for the proposed salt shed storage structure are presented below. Our evaluation and recommendations are based on the review of existing data, recent test borings, subsurface stratigraphy, geotechnical engineering analysis, our current understanding of the proposed project requirements and the minimum requirements of the Code. In addition, recommended design criteria are based on performance tolerances, such as allowable settlement, as understood to relate to similar structures.

8.1 Foundation Recommendations

8.1.1 Shallow Foundations

Based on the presence of the miscellaneous fill and underlying silt and clay strata encountered in the recent test borings, and the potential for unacceptable total and



differential settlement, shallow soil supported foundations are not considered suitable for support of the proposed salt shed storage structure.

8.1.2 Deep Foundations

Consistent with the design presented in the design drawings titled "New York City Department of Sanitation Spring Street Salt Shed" dated April 22, 2013 provided by NYCDDC, the proposed salt shed storage structure is to be supported on deep foundations. Conceptual consideration was given to various deep foundation alternatives, including driven piles, drilled piles, caissons, and micro-caissons. Driven piles were considered to be inappropriate for this project application due to concerns with excessive vibrations associated with driving piles particularly near existing structures, the large diameter/size piles needed to provide the required capacity, potential heave resulting from driving a displacement pile, and difficulty with pile cap connections. Conventional drilled piles (e.g., auger cast in place pile) were considered to be too costly. The anticipated capacity per pile would be limited as a conventional drilled pile would not have a rock socket and would develop capacity in the overburden soils only. Traditional larger diameter drilled caissons (i.e. 36-inch diameter or larger) are not anticipated to be cost effective, due to size of shaft and the need to case the shafts to the top of rock to prevent collapse. Based on site constraints (i.e. proximity to the PANYNJ Holland Tunnel and Ventilation Building), high costs, potential for problems with other deep foundation alternatives, and previous experiences with deep foundation alternatives at the adjacent Manhattan District 1/2/5 Garage site, the micro-caisson foundation was the foundation alternative evaluated for support of the proposed salt shed storage structure and is recommended herein. Micro-caissons are not anticipated to result in excessive vibrations or ground heave, can be constructed to provide the needed high capacity, and are already cased during drilling which prevents collapse of the shaft.

If additional fill material is to be placed adjacent to the proposed structure (greater than approximately 1 foot), some site settlement of the underlying may result causing negative skin friction and the micro-caisson capacity will need to be reduced for this additional negative skin friction. Loads from the proposed structure will be supported on a structural slab that is supported on the micro-caissons. The current top of slab-on-grade elevation for the existing DSNY District 1 garage ranges from El. 5.78 to El. 6.75 and is typically 6 inches thick (bottom of slab elevation El. 5.28 to El. 6.25). The top of the structural slab elevation of the proposed salt shed storage structure is El. 6.5 and is 3 feet thick at the thinnest section (bottom of slab elevation El. 3.5). The bottom of the proposed structural slab (El. 3.5) is at least approximately 1.75 feet lower than the bottom of the existing slab-on-grade. Additionally, the proposed site grades in the yard area are typically 0.1 to 0.25 feet below the existing ground surface elevation. Therefore, no fill or

raise in grade at the Site will occur and settlement and negative skin friction from additional fill material was not considered as part of our analysis.

8.1.2.1 Micro-Caissons

The proposed structure may be supported on cased micro-caissons that derive the capacity rock sockets in the underlying bedrock. The steel casing for the micro-caissons should have a minimum 0.375-inch casing wall thickness and should be backfilled with 4,000 psi grout in accordance with the Code. The casing wall thickness used in the analyses was 0.50 inches. In addition, the gross cross-sectional area of the structural steel core should not exceed 30% of the gross area of the micro-caisson and should have a minimum clearance of 2 inches between the structural core and the casing pipe, in accordance with the Code. The actual casing wall thickness, steel core, and grout strength will be a function of the caisson capacity selected and should be determined in accordance with the Code requirements for allowable stresses. The compression and tension capacities of the micro-caissons are dependent on the bond stress between rock and concrete, length and diameter of the rock socket.

The rock socket design discussed in this report uses an allowable bond strength in rock of 150 to 200 psi for the evaluation of the micro-caisson capacities. A bond strength equal to 200 psi is considered a maximum design value and should be verified by performing load tests. The rock core samples obtained from the project site indicate that the bedding planes of the bedrock are typically aligned in the nearly vertical direction (i.e. 5-10 degrees from vertical plane). In addition, the bedrock is weaker when loaded in the direction parallel to the bedding plane than when loaded in the direction perpendicular to the bedding plane. These vertical planes are parallel to the direction of foundation loading, thus these bedding planes control the allowable bond strength of the rock socket.

Table 8.1.2.1-1 lists feasible micro-caisson capacities, minimum rock socket length, and socket diameter combinations for the support of the proposed salt shed storage structure. A more detailed table including structural capacity is included in Appendix E.

Table 8.1.2.1-1: Feasible Micro-Caisson Capacities, Socket Lengths and Socket Diameters

Casing Diameter (inches)	Rock Socket Diameter (inches)	Design Rock Socket Bond Strength (psi)	Compression Capacity (tons)	Tension Capacity (tons)	Minimum Rock Socket Length (feet) ¹
9.5	8	150	150	75	11
		200	200	100	12

13.75	12	150	200	100	11
		150	300	150	14
		200	200	100	9
		200	300	150	11
18	16	150	200	100	10
		150	300	150	11
		200	200	100	8
		200	300	150	9

Note:

1. Rock Socket length includes minimum 2 feet casing embedment.

The steel casing should be seated at least 2 feet into the bedrock, in accordance with the Code. The micro-caissons will be installed to depths ranging from approximately 110 to 115 feet bgs, including the rock socket. In order to avoid the need for additional equipment and the potential for installation sequence conflicts during construction, the use of multiple micro-caisson diameters on the project is not recommended. In order to optimize the foundation system design (i.e., slab and micro-caissons) and provide for varied capacities where required, it is recommended that the micro-caisson rock socket length be varied and the shaft/rock socket diameters be constant throughout the project.

The micro-caisson foundations should be designed to develop full capacity in a rock socket with a minimum factor of safety of 2.0 in accordance with the Code. Due to variability in the unconfined compressive strength laboratory tests performed on the rock core samples, we recommend at least 4 load tests be performed to confirm micro-caisson capacity in the varied rock conditions at the Site if the micro-caissons are designed with a bond strength of 200 psi. The load tests should be instrumented so that the load transfer to (and the actual rock bond strength of) the rock socket can be evaluated. If/where load test results indicate inadequate capacity based on the rock design bond strength of 200 psi, the rock socket length should be increased to achieve the design load capacity. Alternatively, the micro-caissons can be designed for a bond strength of 150 psi.

In accordance with the Code, the maximum allowable lateral load should be 1 ton, unless verified by a load test. If the lateral loading on the micro-caissons is anticipated to be greater than 1 ton, a load test must be performed.

In accordance with the Code, the micro-caissons should be thoroughly cleaned of foreign materials before filling with grout and steel cores. All rock sockets should be inspected through video methods or by a core boring performed prior to drilling of the socket. Load testing, although not required by the Code, performed in accordance with Section 1808.2.8.3 may be substituted for inspection of the rock sockets.

Axial and lateral micro-caisson capacity calculations are included in Appendix E.

8.1.2.2 Micro-Caisson Cap and Grade Beam Depth

Micro-caisson caps and grade beams should extend to not less than 4.0 feet below any adjacent ground surface exposed to freezing and interior micro-caisson caps and grade beams within heated areas should extend at least 18-inches below the top of the slab, in accordance with Section 1805.2.1 of the Code.

8.2 Lowest Floor/Ground Slabs

The lowest floor slab/ground slab is a structural slab that will be supported on the micro-caissons. Any underslab utilities should be hung from the micro-caisson supported mat. Connections should be designed to carry the weight of the soil over the utilities within a zone extending upward at 1H:2V from the spring line of the utility line. Flexible utility connections and oversized sleeves should be provided through foundation walls and grade beams where utilities enter/exit the structure.

8.3 Design Groundwater Level

The FEMA Flood Insurance Rate Map included in Appendix B shows the Site to be located in Zone AE, within the 100-year flood zone of the Hudson River. Groundwater in observation well was measured at approximately El. -2.6 feet or about 7.9 feet bgs. At this time, an underslab drainage system is not recommended.

8.4 Lateral Loads on Below-Grade Foundation Walls

Lateral loads on the below grade portions of structures that are fixed against rotation at the top may be computed based on equivalent fluid unit weight of soil and groundwater of 60 pcf above the design groundwater level and 90 pcf below the design groundwater level. In addition to these pressures, lateral loads from surface surcharge loading adjacent to the wall should be applied as 0.5 times the surface surcharge pressure over the full height of the wall. Earthquake-induced pressures should be included as applicable per the Code.

8.5 Resistance to Unbalanced Lateral Loads

Unbalanced lateral loads should be resisted by passive resistance on micro-caisson caps and grade beams. Passive resistance up to a maximum equivalent fluid pressure of 150 pcf may be used provided the micro-caisson caps and grade beams are backfilled with compacted fill that is compacted to a density of at least 95 percent of the maximum dry density as determined by laboratory test ASTM D1557.

If additional resistance to unbalanced lateral loads is required, lateral load resistance can be developed from each vertical micro-caisson as indicated in Section 8.1.2.1 above.

8.6 Waterproofing and Underdrains

Based on the drawings provided by the NYCDDC, the salt shed storage structure will not require underdrains. If structure designs, loads or bottom elevations change from what is currently identified in the project drawings, CDM Smith should be notified to review and evaluate proposed conditions.

8.7 Liquefaction Potential and Seismic Design Parameters

The potential for liquefaction of the soils at the Site was evaluated using procedures in the Code. In accordance with the Code, non-cohesive soils below the groundwater table and less than 50 feet below the ground surface shall be considered to have potential for liquefaction. At the Site, the soils within 50 feet of the ground surface are predominantly sand with some to little amounts of fines, and the depth to the groundwater table is approximately 7.7 feet. The Code procedure for evaluating liquefaction uses the Standard Penetration Resistance, or N-values, and Figure 1813.1, which has Limit Lines for "Liquefaction Probable" and "Liquefaction Unlikely" for structures according to Occupancy Categories. The N-values for the borings advanced to a depth greater than 50.0 feet bgs were plotted using the Limit Lines on Figure 1813.1. Most of the N-values for soils within the upper 50 feet of the ground surface fell within the Liquefaction Probable portion of the figure for Occupancy Category III, which includes structures that represent substantial hazards to human life in the event of a failure (Table 1604.5 of the Code).

The potential for liquefaction during a seismic event was also evaluated using the procedures described in a paper entitled *Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and the 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils*, by Youd (Chair.), Idriss (Co-Chair.), et. al., published in the *ASCE Journal of Geotechnical and Geoenvironmental Engineering*, October 2001. As a comparison, the factor of safety against liquefaction was computed for strata encountered in all recent test borings. The peak ground acceleration of 0.146 g was used

in the liquefaction analysis based on Section 1802.2.3 of the Code. An earthquake magnitude of 5.7 was assumed in the analysis based on the mean magnitude obtained from the USGS 2008 Deaggregation Seismic Hazard data. The factor of safety for liquefaction considering the SPT N-values and soil types resulted in values greater than 1.5. Based on these analyses, the soils beneath the Site have a relatively low potential for liquefaction from a seismic event. Liquefaction analysis calculations are included in Appendix E.

The potential for liquefaction has been evaluated based on the existing data and the site is not considered liquefaction susceptible. In addition, a Seismic Site Class D is recommended. The seismic design parameters at the Site are shown in Table 8.7-1.

Table 8.7-1: Seismic Design Parameters

Parameter	Value
Bedrock Acceleration, S_s	0.365
Bedrock Acceleration, S_l	0.071
Site Class	D
Site Coefficient, F_a	1.51
Site Coefficient, F_v	2.4
Design Acceleration, S_{DS}	0.367
Design Acceleration, S_{DI}	0.1136
Peak Ground Acceleration	0.146

8.8 Corrosivity

No corrosion testing was performed under the current work order.

8.9 Construction Considerations

8.9.1 Excavation

Based on the design drawings, foundation installation may require excavations greater than 5 feet deep. Excavation may require dewatering and the use of temporary support of excavation.

The project specifications and associated bid items should include provisions addressing the potential for excavation of soil.

8.9.2 Excavation Support

Excavations for the proposed salt shed storage structure may require the use of an excavation support system to limit excavation quantities, assist in the control of groundwater and to protect adjacent existing utilities, roadways and structures. The design of the excavation support systems should be performed by a professional engineer registered in the State of New York under the employ of the contractor. The design of the excavation support systems should be performed in conjunction with the design of the dewatering systems. The selection of the type of excavation support system will be performed by the contractor.

Excavation support systems may consist of trench boxes, slide-rail support systems, interlocking steel sheeting or soldier pile and lagging with bracing or anchors, if needed. Steel sheeting and soldier pile and lagging may not be cost effective because of the relatively shallow excavation depth anticipated; however, the interlocking steel sheeting will provide better groundwater cutoff than the soldier pile and lagging option. Trench boxes or slide-rail systems may be sufficient for some of the shallow trench excavations; however, trench boxes should not be used for excavations within the zone of influence of existing structures.

Any vertical excavation support members installed within the zone of influence of any existing or new structures, utilities or pipelines should be left in place to avoid disturbing bearing soils as a result of the sheeting removal process. Any sheeting or soldier piles left in place should be cut off at least 5 ft. below the adjacent finished grade.

8.9.3 Backfilling

The Contractor should provide appropriate documentation for proposed backfill materials prior to its use, with supporting laboratory test results. Grain size distribution, maximum dry density, and optimum water content determinations should be performed on representative samples of the Contractor's proposed backfill materials.

Excavation, proofrolling of the subgrade, and the placement of backfill materials should be performed under the oversight of a qualified engineer or technician under the supervision of a Geotechnical Engineer familiar with the design of the proposed structures. Earthwork is subject to special inspection requirements of the Code. No backfill materials should be placed on areas where free water is standing, on frozen



subgrade areas, or on surfaces which have not been approved by qualified geotechnical personnel.

Soils to be used as Controlled Fill should be natural sand or sand and gravel with no particles larger than three inches, with not more than 25% by weight passing a No. 40 sieve, and not more than 10% by weight passing a No. 200 sieve. The limitation on the amount passing a No. 40 sieve is not included in the Code. However, such a limitation will facilitate drainage and compaction. The material passing the No. 200 sieve shall be non-plastic. The soil should be free of organic material and any other deleterious material. Imported material should also be tested for contaminant levels, and should be below action levels set by the New York State Department of Environmental Conservation.

Controlled Fill is to be placed in loose lifts not exceeding twelve inches in thickness, and compacted to 95% of the maximum Modified Proctor density, determined in accordance with the procedures of ASTM D1557, Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft³ (2,700 kN-M/M³

Although not anticipated, any excavated soils meeting the above criteria may be used as Controlled Fill.

8.9.4 Dewatering

Groundwater in the monitoring well was measured at approximately El. -2.6 feet or about 7.9 feet bgs. It is anticipated the excavation for grade beams, micro-caisson caps and utility lines will be above the groundwater level. However, if groundwater is encountered in excavations, a dewatering system will be needed and disposal of pumped water shall be performed in accordance with federal, state, and local regulations.

The contractor will be responsible to design and implement a dewatering system that maintains a dry, undisturbed, and stable subgrade. The design of the dewatering system should be performed by a professional engineer registered in the State of New York. To minimize the potential for disturbance to the excavation subgrade, the groundwater level

should be predrained prior to excavation such that the groundwater level inside the excavations is maintained at least 2 feet below the lowest excavation level at all times.

The dewatering system should be designed in conjunction with the excavation support system selected by the contractor. Depending on the excavation support system selected, wells, well points and/or pumping from open sumps within the excavation may be required. Wells, well points and sumps must be adequately filtered to avoid loss of fines.

8.9.5 Protection of Existing Structures

The PANYNJ Ventilation Building is located adjacent to the proposed salt shed storage structure site. Although somewhat variable, the horizontal distance between the edge of slab in the yard area is typically less than 1 foot from the existing PANYNJ Ventilation Building. The PANYNJ Ventilation Building has a single basement level and is supported on a mat foundation. Micro-caissons installed adjacent to the Ventilation Building should be located so as to maintain at least 3 feet clearance between the micro-caisson and the existing structure. Specialized construction equipment may be required to install the micro-caissons in this area.

We understand that the PANYNJ will review the foundation design for this project and may require additional protective measures be taken.

8.9.5.1 Preconstruction Survey

Prior to start of excavation, installation of excavation support, or dewatering work, a pre-construction survey of the existing structures adjacent to the site including the PANYNJ Holland Tunnel and Ventilation Building, and the Manhattan District 1/2/5 Garage and conditions should be performed within 100 feet of all construction activity that may result in vibrations (e.g. caisson installation, etc). The survey shall consist of a description of interior and exterior conditions. Descriptions shall locate cracks, damage or other defects existing and shall include information to make it possible to determine the effect, if any, of the construction operations on the defect. Where significant cracks or damage exists, or for defects too complicated to describe in words, photographs shall be taken and made part of the record. Contractor's record of the pre-construction survey shall consist of written documentation, video and photographs of the conditions identified. At the completion of the survey, submit copies of the documentation to the Owner.

8.9.5.2 Settlement Monitoring

We recommend that settlement monitoring points be established on the existing structures within 50 feet of the proposed construction. The points should be monitored during the excavation, caisson installation and backfilling work associated with the

proposed construction. We recommend that in addition to the existing structures, the points be established on the existing utility manholes and on the road surface (over existing utilities) adjacent to the excavation and caisson installation.

The points should be installed and baseline elevations taken prior to the start of any construction activity resulting in vibrations. Survey of the monitoring points should be performed daily during excavation and excavation support installation, micro-caisson installation and then twice weekly thereafter until all backfilling is complete. The Contractor should be prepared to alter the excavation or installation methods if settlement exceeding $\frac{1}{4}$ inch is measured at the existing structures. If settlements exceeding $\frac{1}{2}$ inch is measured at any structure or 1 inch at any utility, the contractor should stop all construction activities, stabilize the excavation, and revise the excavation and/or dewatering methods to prevent additional settlement.

Additionally, the contractor should maintain daily logs of construction activity, including the types and models of equipment used and instrumentation monitoring results.

8.9.5.3 Vibration Monitoring

Ground vibrations due to construction activities can cause damage to adjacent structures, utilities and other facilities. To avoid or mitigate this potential damage, limits on ground vibrations in the form of ground displacement, velocity or acceleration at given frequencies are typically established. The United States Bureau of Mines (Siskind, D.E., Stagg, M.S., Kopp, J.W., Dowding, C.H., 1980, Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting: U.S. Bureau of Mines RI 8507) has established criteria to limit ground vibrations using the peak particle velocity (PPV) and frequency parameters. We recommend that procedures for monitoring vibrations during construction be included in the project specifications.

The maximum peak particle velocities associated with construction vibrations at the ground surface at existing adjacent structures and utilities is recommended as follows:

Frequency (Hz)	Max. Peak Particle Velocity (in/sec)	
	Threshold (in/sec)	Limiting (in/sec)
Over 40	1.0	2.0
30 to 40	0.75	1.5
20 to 30	0.5	1.0
Less than 20	0.35	0.5

Lower vibration criteria may be required by the PANYNJ.

If a Threshold Value is reached the contractor shall:

1. Immediately contact the Engineer and discuss remedial measures;
2. Increase the instrument monitoring frequency as directed by the Engineer;
3. Install and monitor additional instruments as directed by the Engineer; and
4. Implement the remedial measures so the Limiting Value is not reached. Contractor may be directed to suspend activities in the affected area with the exception of those actions necessary to avoid exceeding the Limiting Value.

If a Limiting Value is reached the contractor shall stop all work and the site secured until remedial measures have been submitted and approved by the Engineer.

A minimum of two seismographs should be located at adjacent/nearby structures and utilities during all micro-caisson installation activities to confirm compliance with the recommendations herein and record actual impact vibrations.

8.10 Additional Geotechnical Services

As the project proceeds, additional geotechnical engineering services will be required. At this time, these services are anticipated to include the following:

- Address PANYNJ review comments;
- Prepare an instrumentation program to monitor adjacent PANYNJ facilities;
- Geotechnical input for plans and specifications;
- Review of shop drawings and submittals for earthwork and caisson construction;
- Monitor caisson load test, if performed;



NYC Department of Design and Construction
Geotechnical Report
Spring Street Salt Shed
Manhattan, NY

-
- Caisson inspection in accordance with the Code; and
 - General construction oversight and consultation.



9.0 DISCLAIMER

The geotechnical study was performed to explore subsurface conditions at the planned salt shed storage structure, and develop recommendations for the foundations of the proposed structure. The conclusions and recommendations were prepared based on a review of CDM Smith Record of Boring, dated June 2013, Geotechnical Laboratory Test Results, dated June 2013, Geotechnical Engineering Report prepared by Langan and Contract Drawings prepared by the NYCDDC, dated April 22, 2013. No warranties express or implied, are made. In the event that subsurface conditions encountered during construction are different than those presented in this report, DSNY should contact CDM Smith through NYCDDC Bureau of Environmental and Geotechnical Services to re-evaluate. It should be noted that CDM Smith is not retained as part of the design team and the design team is responsible to review and determine applicable recommendations for the project.

This report has been prepared and is respectfully submitted by:

Camp Dresser and McKee



Michael S. Schultz, P.E.
Contract Executive

July 16, 2013

Date



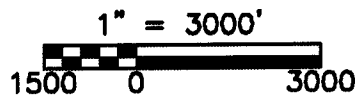
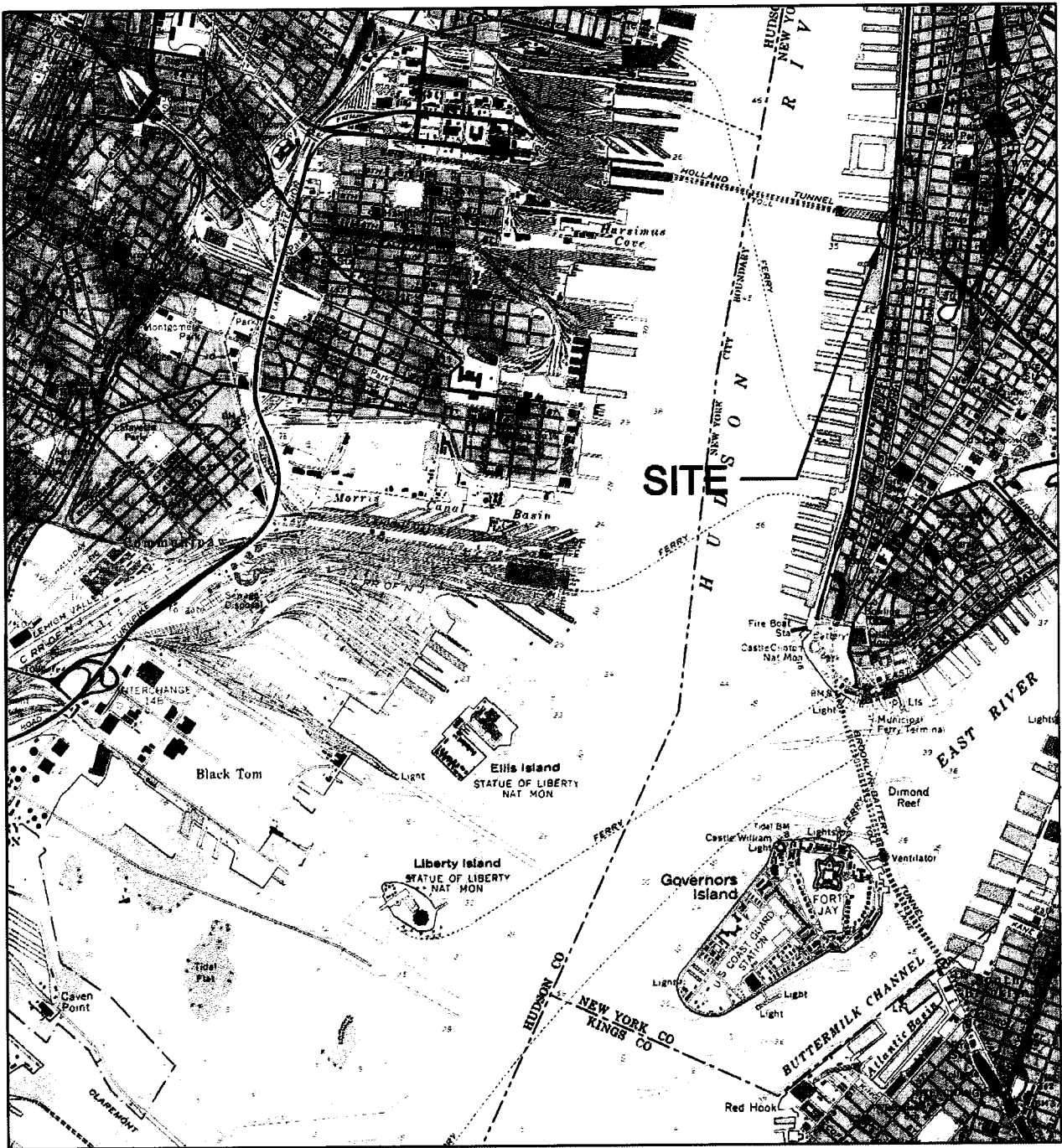
Kapila Pathirage, Ph.D., P.E.
Project Manager

July 16, 2013

Date

FIGURE 1

Site Location Plan



MAP SOURCE:

U.S.G.S. 7.5 MIN SERIES QUADRANGLES OF
JERSEY CITY, DATED 1967



CITY OF NEW YORK
DEPARTMENT OF DESIGN & CONSTRUCTION
DIVISION OF SAFETY AND SITE SUPPORT

4050

PREPARED FOR: **BUREAU OF ENVIRONMENTAL
AND GEOTECHNICAL SERVICES**

WORK ORDER NO.
9041-CDM-8543

PREPARED BY: **CDM SMITH**
14 WALL STREET, SUITE 1702
NEW YORK, NY 10005

FIGURE NO. 1

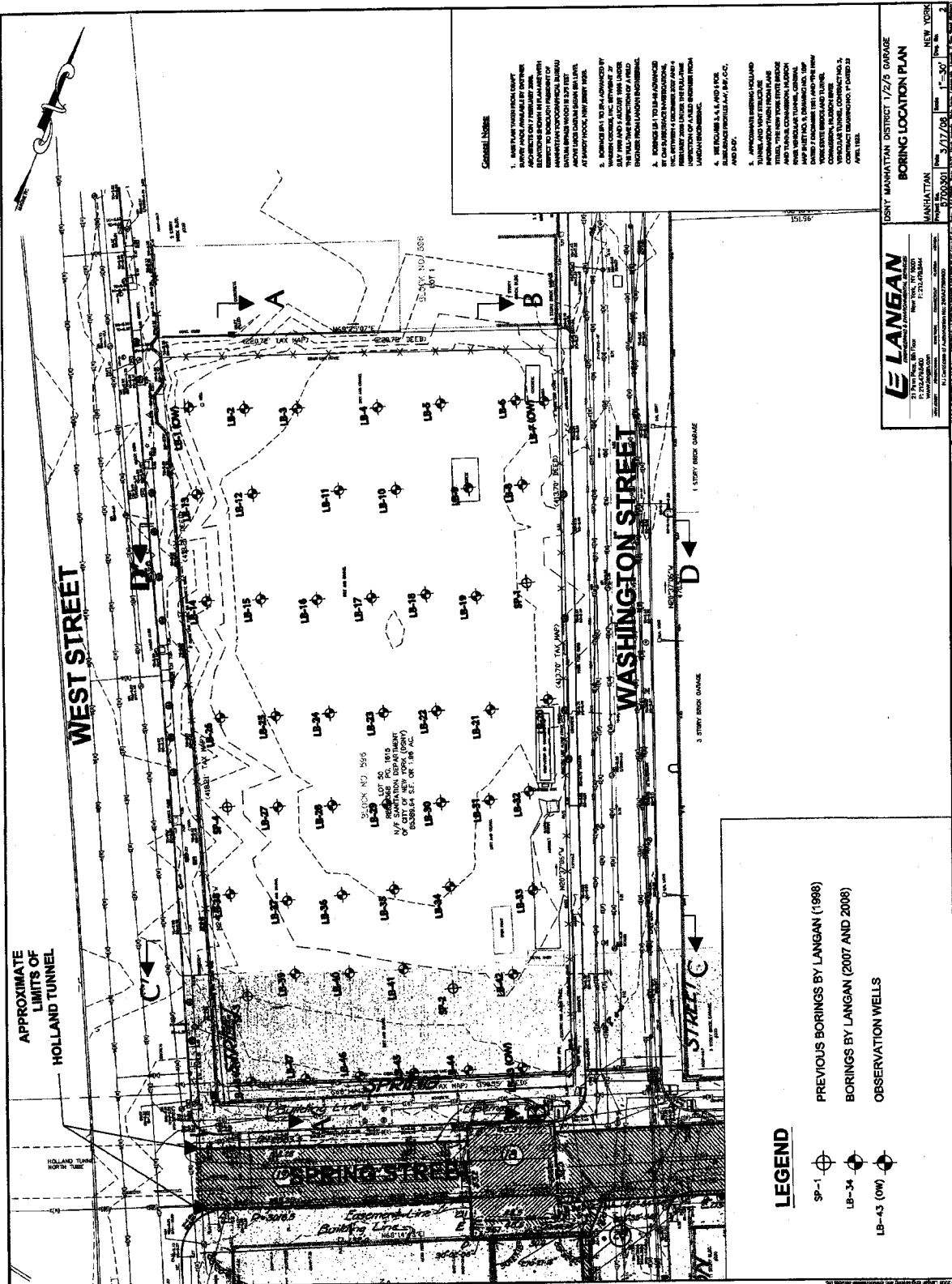
SPRING STREET SALT SHED
553 CANAL STREET
BOROUGH OF MANHATTAN

SITE LOCATION PLAN

DATE JULY 1, 2018	SHEET AS NOTED	SHEET 1 OF 1
----------------------	-------------------	-----------------

APPENDIX A

Relevant Existing Soil Boring Logs



General Notes

1. THE PLAN INFORMATION SHOWN HEREON IS BASED ON THE RECORD DRAWINGS AND SURVEY DATA PROVIDED BY THE CLIENT. THE ENGINEER HAS CONDUCTED VISUAL GENERAL VERIFICATION OF THE INFORMATION SHOWN HEREON AND HAS FOUND IT TO BE REASONABLY ACCURATE. THE ENGINEER HAS NOT CONDUCTED A FIELD SURVEY OF THE INFORMATION SHOWN HEREON AND IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THEREIN.
2. THE INFORMATION SHOWN HEREON IS FOR GENERAL INFORMATION ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSE. THE INFORMATION SHOWN HEREON IS NOT TO BE USED FOR ANY OTHER PURPOSE.
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USNY MANHATTAN DISTRICT 1/2/5 GARAGE
 BORING LOCATION PLAN
 MANHATTAN
 DATE: 3/17/08
 SCALE: 1"=30'
 SHEET NO. 2
 TOTAL SHEETS: 2

ELANGAN
 ENGINEERING & ARCHITECTURE
 110 WEST 42ND STREET, SUITE 1000
 NEW YORK, NY 10018
 TEL: 212-692-1000
 FAX: 212-692-1001
 WWW.ELANGAN.COM

LEGEND

- SP-1 PREVIOUS BORINGS BY LANGAN (1988)
- LB-34 BORINGS BY LANGAN (2007 AND 2008)
- LB-43 (OW) OBSERVATION WELLS

APPROXIMATE LIMITS OF HOLLAND TUNNEL

WASHINGTON STREET

WEST STREET

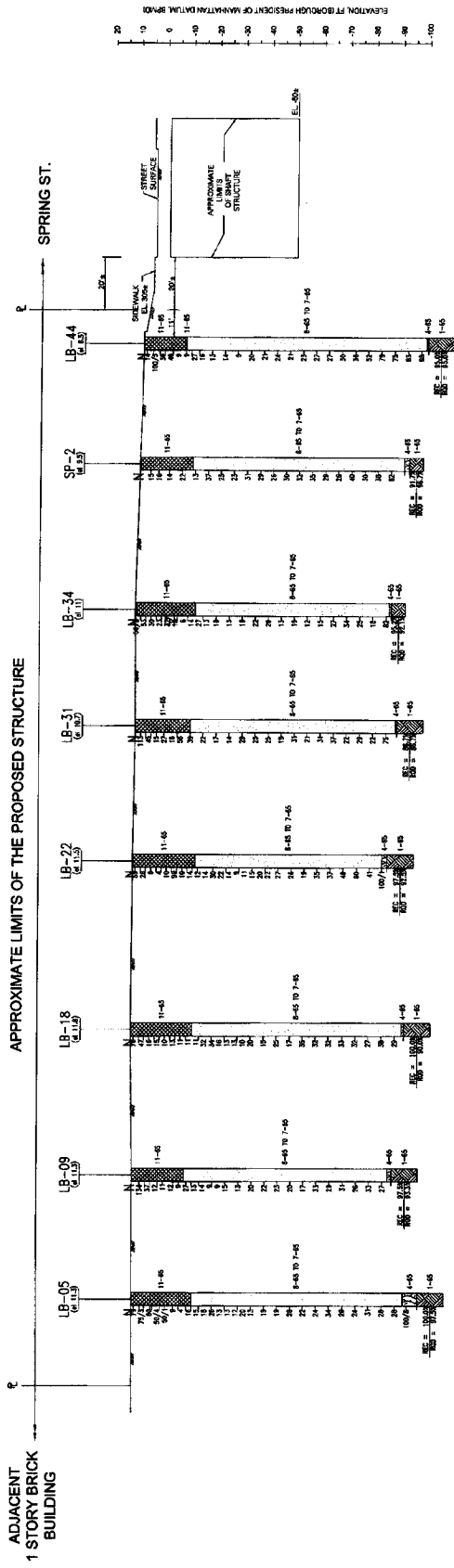
BORING LINE

STREET C

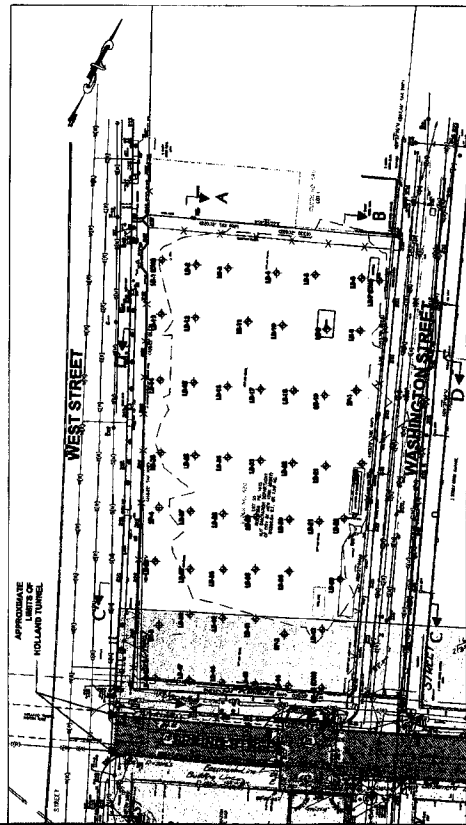
3 STORY BRICK GARAGE

1 STORY BRICK GARAGE

APPROXIMATE LIMITS OF THE PROPOSED STRUCTURE



SUBSURFACE PROFILE B-B'
SCALE: 1"=20'



SITE PLAN
SCALE: 1"=50'

- GENERAL NOTES**
1. ALL ELEVATIONS SHOWN IN PLAN ARE WITH RESPECT TO BENCHMARK PRESIDENT OF THE UNITED STATES (ELEVATION 100.00) LOCATED AT 1000 WEST 110TH STREET, NEW YORK, N.Y. 10025.
 2. APPROXIMATE LIMITS OF PROPOSED STRUCTURE ARE SHOWN IN THIS DRAWING FOR INFORMATION ONLY. THE FINAL LIMITS OF THE PROPOSED STRUCTURE SHALL BE DETERMINED BY THE CONTRACTOR.
 3. APPROXIMATE LIMITS OF PROPOSED STRUCTURE ARE SHOWN IN THIS DRAWING FOR INFORMATION ONLY. THE FINAL LIMITS OF THE PROPOSED STRUCTURE SHALL BE DETERMINED BY THE CONTRACTOR.
 4. HOLLAND TUNNEL AND VENT STRUCTURE INFORMATION TAKEN FROM PLANS AND SPECIFICATIONS OF THE HOLLAND TUNNEL AUTHORITY, NEW YORK, N.Y. 10007.
 5. HOLLAND TUNNEL AND VENT STRUCTURE INFORMATION TAKEN FROM PLANS AND SPECIFICATIONS OF THE HOLLAND TUNNEL AUTHORITY, NEW YORK, N.Y. 10007.

LEGEND

Symbol	Description
Symbol	Open to City
Symbol	Proposed
Symbol	Existing
Symbol	Proposed
Symbol	Existing
Symbol	Proposed
Symbol	Existing

<p>ELANGAN ENGINEERS & ARCHITECTS, INC. 21 West 11th Street, 8th Floor New York, NY 10007-2777 Tel: 212-477-3344 Fax: 212-477-3345 www.elangan.com</p>	<p>Project: DSNY MANHATTAN DISTRICT 1/2/5 GARAGE</p>	<p>Drawing Title: SUBSURFACE PROFILE B-B'</p>	<p>Drawing No.: 570001</p>
	<p>Manhattan</p>	<p>Date: 09/2008</p>	<p>Scale: AS SHOWN</p>

File name: U:\Manhattan\570001\Garage.dwg - 9/20/08 11:00:00 AM User: mcmahon Plot Date: 9/20/08 11:00:00 AM User: mcmahon Plot Scale: 1/4"=1'-0" Plot Sheet: 4 of 4

Project Manhattan District 1/2/5 Garage				Project No. 5700301			
Location New York, NY				Elevation and Datum el 9 BPMD Borough President of Manhattan			
Drilling Agency CMI Subsurface Investigations, Inc.				Date Started 1/24/08		Date Finished 1/25/08	
Drilling Equipment Mobile B-61				Completion Depth 114 ft		Rock Depth 104 ft	
Size and Type of Bit 3-7/8" Tri-Cone Roller Bit				Number of Samples Disturbed 24		Undisturbed 0	
Casing Diameter (in) 4" ID Steel		Casing Depth (ft) 25		Water Level (ft.) First ∇ 16		Completion ∇ 15.7	
Casing Hammer Donut		Weight (lbs) 300 lb		Drop (in) 24"		Drilling Foreman John Imperato	
Sampler 2" OD Split Spoon				Inspecting Engineer Matthew Bryant			
Sampler Hammer Donut		Weight (lbs) 140 lb		Drop (in) 30"			

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MATERIAL SYMBOL	Elev. (ft)	Sample Description	Casing min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
					Number	Type	Recov. (ft)	Penetr. resist. BL/6in		N-Value (Blows/ft) 10 20 30 40
	+9.0	GRAVEL, sm. c-f sand, tr. brick fragments [FILL](dry) BC: 11-65		0				37		Start drilling 1/24/08
		C-f SAND, sm. gravel, sm. brick [FILL](dry)		1	S-1	SS	6	16		
		BRICK (2") & CONCRETE (3") [FILL](dry)		2	S-2	SS	3	5		
		C-m SAND, sm. gravel, sm. brick, sm. concrete [FILL](moist)		3	S-3	SS	4	3		
		GRAVEL, sm. c-m sand [FILL](moist)		4	S-4	SS	5	4		
		Brown m-f SAND, sm. gravel, sm. brick [FILL](moist)		5	S-5	SS	3	3		
		S-7A (2"): Reddish brown c-m SAND [FILL]		6	S-6	SS	4	4		
		S-7B (4"): Black clayey organic SILT [OL] BC: 11-65		7	S-7a,b,c	SS	11	3		
		S-7C (5"): Black c. SAND and GRAVEL [SP] BC: 7-65		8				7		
				9				12		
				10				17		
				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

-6.6
-7.2

Refusal

Drill to 5'
Attempt sample at 5'
(refusal)
Drill to 6'

Casing to 9'

Casing to 14'
Drill to 15'

Drive casing to 19'
Drill to 20'

Project		Project No.									
Manhattan District 1/2/5 Garage		5700301									
Location		Elevation and Datum									
New York, NY		el 9 BPMD Borough President of Manhattan									
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recoy (in)	Penetr. resist BU/in		N-Value (Blows/ft)	
		Reddish brown f. SAND, tr. mica [SP](wet)		45							
				46	S-13	SS	15	6	13		
				47				7			Drill to 50'; smooth
				48				8			
				49							
			Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		50				6		
					51	S-14	SS	15	7	15	
					52				8		Drill to 55'; smooth
					53				7		
					54						
			Reddish brown f. SAND, sm. silt, tr. mica [SP/SM](wet)		55				5		
					56	S-15	SS	18	6	11	
					57				5		Drill to 60'; smooth
					58				7		
					59						
			Reddish brown f. SAND, tr. silt, tr. mica [SP](wet)		60				8		silty (top 1")
					61	S-16	SS	15	10	22	
				62				12		Drill to 65'; smooth	
				63				10			
				64							
		Reddish brown f. SAND, tr. silt, tr. mica [SP/SM](wet)		65				7			
				66	S-17	SS	18	7	15		
				67				8		Drill to 70'; smooth	
				68				10		E.O.D. 1/24/08	
				69						Start day 1/25/08	
				70							

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Project		Project No.									
Manhattan District 1/2/5 Garage		5700301									
Location		Elevation and Datum									
New York, NY		el 9 BPMD Borough President of Manhattan									
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. BU/6in		N-Value (Blows/ft)	
	70	Reddish brown f. SAND, sm. silt to silty, tr. mica [SP/SM](wet)									
	71			S-18	SS	20	7	8	21		
	72						13	18		Drill to 75'; smooth	
	73										
	74										
	75	Reddish brown f. SAND, tr. to sm silt, tr. mica [SP/SM](wet)						8			Silt zone
	76			S-19	SS	15	11	12	23		
	77						14			Drill to 80'; smooth	
	78										
	79										
	80	Reddish brown f. SAND, tr. silt, tr. mica [SP](wet)						12			
	81			S-20	SS	NA	13	17	30		
	82						16			Drill to 85'; smooth	
	83										
	84										
	85	Reddish brown c. SAND, tr. gravel [SP](wet) BC: 7-65						10			
	86			S-21	SS	11	11	17	28		
	87						20			Drill to 90'; harder drilling	
	88										
	89										
	90	Reddish brown c. SAND, tr. gravel [SP](wet)						29			
	91			S-22	SS	14	33	38			
92						30			Drill to 95'; smooth		
93											
94											
95											

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Project		Project No.								
Manhattan District 1/2/5 Garage		5700301								
Location		Elevation and Datum								
New York, NY		el 9 BPMD Borough President of Manhattan								
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coing mm/ft	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recov. (in)		Penetr. resist. BL/ft	N-Value (Blows/ft)
		Reddish brown m-f SAND, tr. mica [SP](wet) BC: 8-65		95				23		
				96	S-23	SS	18	26		
				97				31		
				98				34		
				99						
			Reddish brown f. SAND, tr. mica, tr. gravel [SP](wet)		100				24	
					101	S-24	SS	20	26	
					102				60	
					103				82	
		-93.5	BC: 4-65		104					
	-95.0	BC: 1-65		105						
		Black to gray GNEISS, very hard, unweathered to fresh, sound w/ wide fracture spacing, fine grained [BEDROCK]		106						
				107						
				108						
				109						
				110						
				111						
				112						
				113						
	-105.0	End of boring at 114'		114						
				115						
				116						
				117						
				118						
				119						
				120						

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C-1
CORE
REC=116"/120" =97%
RQD=116"/120" =97%

Drill to 100'; smooth

Slightly harder mica content @ end of spoon.
Hard drilling at 102'
Drill to 104'; very hard drilling

Start core at 9:30am (1/25/08)

End core at 10:22am (1/25/08)

Borehole backfilled upon completion

Project Manhattan District 1/2/5 Garage				Project No. 5700301			
Location New York, NY				Elevation and Datum el 8.5 BPMD Borough President of Manhattan			
Drilling Agency CMI Subsurface Investigations, Inc.				Date Started 1/24/08		Date Finished 1/28/08	
Drilling Equipment Mobile B56				Completion Depth 118.5 ft		Rock Depth 108.5 ft	
Size and Type of Bit 3-7/8" Tri-Cone Roller Bit				Number of Samples Disturbed 25		Undisturbed 0	
Casing Diameter (in) 4" ID Steel		Casing Depth (ft) 25		Water Level (ft.) First ∇ -		Completion ∇ -	
Casing Hammer Donut	Weight (lbs) 300 lb	Drop (in) 24"	Drilling Foreman Freddy Navarro				
Sampler 2" OD Split Spoon Sampler / NX Core Barrel				Inspecting Engineer Matthew Bryant and Blaire Banagan			
Casing Hammer Donut	Weight (lbs) 140 lb	Drop (in) 30"					

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MATERIAL SYMBOL	Elev. (ft) +8.5	Sample Description	Casing (in)	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
					Number	Type	Recov. (in)	Penetr. / resist. BL/6in		N-Value (Blows/ft) 10 20 30 40
[Cross-hatched pattern]		Black to gray to brown c-m SAND, gravel, brick [FILL] BC: 11-65		0				19		Start drilling 1/24/08 Refusal @ 3.5' Drill through obstruction. Break through at ~5' Refusal (brick at end of spoon) Casing to 7' (6') Drill to 7' Drive casing to 10' (9') Drill to 10' Drive casing to 15' (14') E.O.D. 1/24/08 Start day 1/25/08 Drill to 15' Drive casing to 20' (19') Drill to 20'
		BRICK, sm. gravel, sm. m-f sand, concrete in tip [FILL](dry)		1	S-1	SS	11	9	5	
				2	S-2	SS	3	3	1	
				3					100/5"	
		GRAVEL, sm. c. sand, sm. brick, tr. wood, tr. ceramic [FILL](moist)		4						
				5	S-3	SS	10	12	13	
				6					17	
				7	S-4	SS	7	13	14	
		BRICK and GRAVEL, sm. c-m sand, tr. white material (?), tr. ceramic [FILL](moist)		8					20	
				9						
		Reddish brown m-f SAND, tr. gravel [FILL](moist)		10						
				11	S-5	SS	7	4	4	
				12					5	
				13					6	
				14						
			15							
	-7.3	Reddish brown m-f sand (1") [FILL]		15						
	-7.7	Black organic clayey SILT (3") [OL] (wet) BC: 11-65		16	S-6	SS	8	3	6	
		Black coarse gravelly SAND (4") [SP](wet) BC: 7-65		17				17		
		Black c. gravelly SAND (2") to reddish brown f. SAND, tr. silt, tr. mica (2") [SP](wet)		18	S-7	SS	4	12	15	
			19					16		
			20							

Project		Project No.								
Manhattan District 1/2/5 Garage		5700301								
Location		Elevation and Datum								
New York, NY		at 8.5 BPMD Borough President of Manhattan								
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
				Depth Scale	Number	Type	Recover. (in)	Penetr. resist. (psi)		N-Value (Blows/ft)
[Patterned Area]	20	Reddish brown f. SAND, tr. mica [SP](wet) BC: 8-65					7			
	21		S-8	SS	10	8	8	16		Drive casing to 25' Drill to 25'
	22					8	7			
	23									
	24									
	25	Reddish brown f. SAND, sm. silt, tr. mica [SP/SM](wet)					6			
	26		S-9	SS	21	6	7	13		Drill to 30'; smooth
	27					7	10			
	28									
	29									
	30	Reddish brown f. SAND, sm. silt to tr. silt, tr. mica [SP/SM](wet)					4			
	31		S-10	SS	20	6	8	14		Drill to 35'; smooth
32					8	10				
33										
34										
35	Reddish brown f. silty SAND to sm. silt, tr. mica [SM](wet)					3				
36		S-11	SS	21	4	5	9		Drill to 40'; smooth	
37					5	7				
38										
39										
40	Reddish brown f. SAND, sm. silt to silty, tr. mica [SP/SM](wet)					5				
41		S-12	SS	21	10	10	20		Drill to 45'; smooth	
42					10	13				
43										
44										
45										

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Project		Project No.									
Manhattan District 1/2/5 Garage		5700301									
Location		Elevation and Datum									
New York, NY		el 8.5 BPMD Borough President of Manhattan									
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coming min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Revolv. (in)	Penetr. resist. BL/in		N-Value (Blows/ft)	
		Reddish brown f. SAND, tr. silt, tr. mica [SP](wet)		45				7			
				46	S-13	SS	19	11	21		
								10			
								10			
					47						
					48						Drill to 50'; smooth
					49						
			Reddish brown f. SAND, sm. silt, tr. mica [SP/SM](wet)		50				7		
					51	S-14	SS	24	11	24	
									13		
					52				16		Drill to 55'; smooth
					53						
					54						
			Reddish brown f. SAND, sm. silt to tr. silt, tr. mica [SP-SM](wet)		55				6		
					56	S-15	SS	17	9	21	
									12		
					57				12		Drill to 60'; smooth
				58							
				59							
		Reddish brown f. SAND, tr. silt, tr. mica [SP](wet)		60				7			
				61	S-16	SS	18	11	23		
								12			
				62				13		Drill to 65'; smooth	
				63							
				64							
		Reddish brown f. SAND, tr. silt, tr. mica [SP](wet)		65				9			
				66	S-17	SS	15	13	27		
								14			
				67				16		Drill to 70'; smooth	
				68							
				69							
				70							

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Project		Project No.								
Manhattan District 1/2/5 Garage		5700301								
Location		Elevation and Datum								
New York, NY		el 8.5 BPMD Borough President of Manhattan								
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring miny ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
					Number	Type	Recov. (in)	Pens. resist. BL/6in		N-Value (Blows/ft) 10 20 30 40
		Reddish brown f. silty SAND to sm silt, tr. mica [SP/SM](wet)		70				6		
				71	S-18	SS	20	12	27*	
				72				15		
				73				26		
				74						
			Reddish brown f. SAND, tr. silt, lr. mica [SP](wet)		75				12	
				76	S-19	SS	16	15	30*	
				77				15		
				78				20		
				79						
			Reddish brown f. SAND, sm. silt to silty, tr. mica [SP/SM](wet) 2" c-m SAND at tip of SS		80				14	
				81	S-20	SS	21	17	36*	
				82				19		
				83				29		
				84						
			Reddish brown c. SAND, tr. gravel [SP](wet) BC: 7-65		85				12	
				86	S-21	SS	13	19	33	
				87				50		
				88						
				89						
			Reddish brown c-m SAND, tr. gravel [SP](wet)		90				28	
				91	S-22	SS	16	38	41	
			92				50			
			93							
			94							
			95							

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Project		Project No.							
Manhattan District 1/2/5 Garage		5700301							
Location		Elevation and Datum							
New York, NY		el 8.5 BPMD Borough President of Manhattan							
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring size ft	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
				Depth Scale	Number	Type	Recov. (in)		Penetr. resist. BL/6in
								10 20 30 40	
		Reddish brown c-m SAND, tr. gravel [SP](wet)		95				38	
				96	S-23	SS	14	40	
								35	
				97				38	
				98					Drill to 100'; slightly harder drilling
				99					
				100				30	
		Reddish brown f. SAND, tr. silt, tr. mica [SP](wet) BC: 8-65		101	S-24	SS	19	41	
				102				42	
				103				35	
				104					Drill to 105'; smooth
				105					
				106	S-25	SS	14	34	
				107				45	
				108				53	
				109				67	
	99.5	BC: 4-65		108					1"-2" thick layer of coarse sand
	100.0			109					
				110					
		Dark gray and white schistic GNEISS w/ garnet intrusions [BEDROCK] BC: 1-65		111					Rig chatter from 108' Drill to 108.5' E.O.D. 1/25/08 Start day 1/28/08 Core 108.5 - 118.5
				112					
				113					
				114					
				115					
				116					
				117					
				118					
				119					
				120					
	110.0	End of boring at 118.5'							End of boring @ 118.5' @ 10:15am Borehole backfilled upon completion

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C-1
CORE
REC=114"/120" ~95%
RQD=114"/120" ~95%

Project		Project No.																	
Manhattan District 1/2/5 Garage		5700301																	
Location		Elevation and Datum																	
New York, NY		el 8 BPMD Borough President of Manhattan																	
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Casing min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)										
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. BL/6in		N-Value (Blows/ft)									
		Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)		20					7										
				21	S-8	SS	12		8										
				22					11										
				23					12										
				24															
		Reddish brown f. SAND, tr. silt, tr. mica [SP/SM](wet)		25					9										
				26	S-9	SS	17		5										
				27					7										
				28															
				29															
		Reddish brown f. SAND, tr. silt, tr. mica [SP/SM](wet)		30					6										
				31	S-10	SS	10		6										
				32					8										
				33					8										
				34															
		Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)		35					12										
				36	S-11	SS	5		7										
				37					5										
				38					6										
				39															
		Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)		40					12										
				41	S-12	SS	16		8										
				42					6										
				43					9										
				44															
				45															

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Project		Project No.			
Location		Elevation and Datum			
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Sample Data	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
			Depth Scale Number Type Recov. (in) Penetr. resist BL/ft N-Value (Blows/ft) 10 20 30 40		
		Manhattan District 1/2/5 Garage	5700301		
		New York, NY	el 8 BPMD Borough President of Manhattan		
		Reddish brown f. SAND, tr. silt, tr. mica [SP/SM](wet)	45 46 S-13 SS 7 47 5 8 48 9 7 49 50 51 S-14 SS 8 52 19 12 13 53 54 55 56 S-15 SS 9 57 14 12 13 58 59 60 61 S-16 SS 11 62 13 15 17 63 64 65 66 S-17 SS 10 67 16 10 12 15 68 69 70	17' 20' 24' 28' 22'	Drill to 50' Drill to 55' Drill to 60' Drill to 65' Drill to 70'
		Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)			
		Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)			
		Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)			
		Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)			
		Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)			
		Reddish brown m-f SAND, sm. silt, tr. mica [SP/SM](wet)			

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Project		Project No.									
Manhattan District 1/2/5 Garage		5700301									
Location		Elevation and Datum									
New York, NY		e1 8 BPMD Borough President of Manhattan									
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. BLU/in		N-Value (Blows/ft)	
	70	Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)									
	71		S-18	SS	15	10	24				
	72					14					
	73					14					
	74										
	75	Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)				10					
	76		S-19	SS	NA	14	32				
	77					18					
	78					16					
	79										
	80	Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)				12					
	81		S-20	SS	16	13	27				
	82					14					
	83					18					
	84										
	85	Reddish brown c-f SAND, tr. silt, tr. mica, tr. m. gravel [SP](wet) BC: 7-65				10					
	86		S-21	SS	13	13	27				
	87					14					
	88					20					
	89										
	90	Reddish brown c. SAND, sm. gravel [SP](wet)				17					
	91		S-22	SS	13	22	49				
92					27						
93					31						
94											
95											

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Drill to 75'

Drill to 80'

Drill to 85'

Drill to 90'

Drill to 95'

Project		Project No.									
Manhattan District 1/2/5 Garage		5700301									
Location		Elevation and Datum									
New York, NY		el 8 BPMD Borough President of Manhattan									
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Casing min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. BU/ft		N-Value (Blows/ft)	
		Reddish brown c. SAND [SP](wet)		95				22		Drill to 100'; slow but smooth	
				96	S-23	SS	18	25			
				97				28			
				98				30			
			Reddish brown c. SAND, tr. to sm. gravel [SP](wet)		100				20		
					101	S-24	SS	14	23		
					102				35		
					103				32		
			Reddish brown f. SAND, tr. silt [SP](wet) BC: 8-65		105				30		
					106	S-25	SS	17	42		
					107				42		
				108				47			
		Reddish brown f. SAND, tr. silt, tr. mica (10") [SP](wet) BC: 8-65		110				30			
				111	S-26	SS	12	28			
		Decomposed rock at tip of spoon (2") BC: 4-65		111				35			
				112				100/4"	Refusal		
		Black to gray micaceous GNEISS w/ quartz and garnet intrusions, slightly weathered to unweathered, slightly fractured to sound, close to moderate fracture spacing, medium to coarse grained [BEDROCK] BC: 2-65		113	Run-1	NX CORE	REC=57"/60" =95%	RQD=49"/60" =82%			
				114							
				115							
				116							
		End of boring at 117'		117							
				118							
				119							
				120							

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Project Manhattan District 1/2/5 Garage		Project No. 5700301	
Location New York, NY		Elevation and Datum el 8 BPMD Borough President of Manhattan	
Drilling Agency CMI Subsurface Investigations, Inc.		Date Started 1/15/08	Date Finished 1/16/08
Drilling Equipment Mobile B-61 Truck-Mounted Drill Rig		Completion Depth 118 ft	Rock Depth 108 ft
Size and Type of Bit 3-7/8" Tri-Cone Roller Bit		Number of Samples	Disturbed 25 Undisturbed 0 Core 1
Casing Diameter (in) 4" ID Steel Casing		Casing Depth (ft) 25	Water Level (ft.) First ∇ - Completion ∇ - 24 HR. ∇ -
Casing Hammer Donut	Weight (lbs) 300 lb	Drop (in) 24"	Drilling Foreman John Imperato
Sampler 2" OD Split Spoon Sampler / NX Core Barrel		Inspecting Engineer Matthew Bryant	
Sampler Hammer Donut	Weight (lbs) 140 lb	Drop (in) 30"	

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MATERIAL SYMBOL	Elev. (ft) +8.0	Sample Description	Casing min./ft	Sample Data						Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. Blows/in.	N-Value (Blows/ft) 10 20 30 40	
[Cross-hatched pattern]		Brown and black c-f SAND, sm. gravel, tr. brick fragments [FILL](moist/dry) BC: 11-85		0				6		Hole was moved to 11.5' off the Spring St. fence instead of 10' to give the drillers more room to pull rods.
		BRICK, sm. tan m-f sand, tr. gravel [FILL](dry)		1	S-1	SS	10	10	15	
		BRICK [FILL]		2				8		
		BRICK [FILL]		3	S-2	SS	16	22	46	
		BRICK, sm. brown and black m-f sand, tr. gravel [FILL](moist)		4				16		
		Brown c-m SAND [FILL](moist)		5	S-3	SS	9	9	17	
		Reddish brown c-m SAND [FILL]		6				6		
			7	S-4	SS	9	9	14	Drill to 8' w/ 4-7/8" rollerbit Spin casing to 8' Clean hole w/ 2-7/8" rollerbit to 8' BRICK at top of SS	
			8				5			
			9	S-5	SS	5	5	8	Spin casing to 14' (15') Drill to 15'	
			10				3			
			11	S-6	SS	9	3	7		
			12				4		Push (drive last 1') casing to 19' (20') Drill to 20' Slight rig chatter 18'-20' Wash color change to gray	
			13				3			
			14				3			
			15	S-7	SS	10	2	6		
			16				3			
			17				3			
			18							
			19							
			20							

Project		Project No.								
Manhattan District 1/2/5 Garage		5700301								
Location		Elevation and Datum								
New York, NY		el 8 BPMD Borough President of Manhattan								
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min ft	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recov. (in)		Penetr. resist. BL/ft	N-Value (Blows/ft)
	-13.0	S-8A: (top 4") C-m SAND, sm. gravel, tr. brick, slight petroleum odor [FILL](moist)	20					31		at 19.5'
		S-8B: (bottom 4") Reddish brown f. SAND, tr. to sm. silt [SP/SM](moist) BC: 8-65	21	S-8	SS	8	7	20	27	
			22					5		
			23							
			24							Casing to 25' Mix drilling mud Drill to 25'; smooth
		Reddish brown f. SAND, sm. silt to silty, tr. mica, w/ various small SILT zones [SP/SM](wet)	25					4		
			26	S-9	SS	19	7	4	11	
			27					7		
			28							Drill to 30'; smooth
			29							
		Reddish brown f. SAND, sm. silt to silty, tr. mica [SP/SM](wet)	30					5		
			31	S-10	SS	22	5	4	9	Less silt in first 10"-12" of SS
			32					7		Silty in last 10"-12" of SS
			33							Drill to 35'; smooth
			34							
		Reddish brown f. silty SAND to sm. silt, tr. mica [SP/SM](wet)	35					5		
			36	S-11	SS	24	9	8	17	
			37					13		SILT at end of SS
			38							Drill to 40'; smooth
			39							
		Reddish brown m-f SAND, tr. mica [SP](wet)	40					6		
			41	S-12	SS	17	8	7	15	
			42					8		
			43							
			44							Drill to 45'; smooth
			45							

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Project		Project No.								
Location		Elevation and Datum								
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Casing min./ft	Sample Data						Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/ft	N-Value (Blows/ft)	
		Reddish brown m-f SAND, tr. mica [SP](wet)		45						
				46	S-13	SS	16	6	4	10
				47				6		
				48						Drill to 50'; smooth
				49						
		Reddish brown m-f SAND, tr. silt, tr. mica [SP](wet)		50						2"-3" SILT zone at top of SS
				51	S-14	SS	20	7	10	22
				52				12		
				53						Drill to 55'; smooth
				54						
		Reddish brown f. SAND, tr. silt to silty, tr. mica [SP/SM](wet)		55						
				56	S-15	SS	20	7	6	11
				57				5		Tr. silt in top 6"-8" of SS Silty in bottom 6"-8" of SS
				58						Drill to 60'; smooth
				59						
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		60						
				61	S-16	SS	20	5	7	22
				62				15		
				63						Drill to 65'; smooth
				64						
		Reddish brown f. SAND, tr. silt, tr. mica [SP/SM](wet)		65						
				66	S-17	SS	21	9	10	24
				67				14		
				68						Drill to 70'; smooth
				69						
				70						

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Project		Project No.			
Location		Elevation and Datum			
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Sample Data	Remarks	
			Depth Scale Number Type Recov. (ft) Penetr. resist. BL/ft N-Value (Blows/ft)		
		Manhattan District 1/2/5 Garage	5700301		
		New York, NY	el 8 BPMD Borough President of Manhattan		
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)	70 71 S-18 SS 17 72 73 74 75 76 S-19 SS 24 77 78 79 80 81 S-20 SS 20 82 83 84 85 86 S-21 SS 20 87 88 89 90 91 S-22 SS 8 92 93 94 95	8 13 18 19 5 9 15 21 12 19 19 19 9 13 19 20 17 22 28 32 31 24 38 32 50	Drill to 75'; smooth Drill to 80'; smooth Drill to 85'; smooth End of day 1/15/08 Start day 1/16/08 Drill to 90'; smooth Drill to 95' Hard drilling w/ slight chatter 90'-93.5' Harder drilling 93.5'-85'
		Reddish brown f. SAND, sm. silt to silty, tr. mica [SP/SM](wet)			
		Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)			
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)			
		Reddish brown c-f SAND and GRAVEL [SP](wet) BC: 7-65			

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Project		Project No.							
Location		Elevation and Datum							
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min/ft	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
				Depth Scale	Number	Type	Recov. (in)		N-Value (Blows/ft)
		Reddish brown c-f SAND, sm. gravel [SP](wet)		95					
				96	S-23	SS	16	36	Coarser SAND in top half of SS
								46	
								41	Finer SAND in bottom half of SS
				97				44	
				98					Drill to 100'; slow
				99					
		No Recovery		100					
				101	S-24	SS	0	15	
								18	
								25	
				102				30	
				103					
				104					Drill to 105'; smooth but slow
				105					
		Reddish brown f. to v. f. SAND, tr. to sm. silt [SP-SM](wet) BC: 8-65		105				22	
				106	S-25	SS	9	29	
								100/5.5'	Refusal
		BC: 4-65' ? - ? - ? - ?		106					
				107					Heavy chatter 106.5'-107.5' Hard at 108'
				108					Begin core 8:48am (1/16/08)
		BC: 1-65		108					
				109					
		Gray schistic GNEISS, slightly weathered to fresh, sound w/ moderate to wide to very wide fracture spacing, medium grained [BEDROCK]		5					
				8					
				110					
				7					
				111					
				8					
				112					
				7					
				113					
				7					
				114					
				9					
				115					
				9					
				116					
				7					
				117					
				NA					
				118					End core (1/16/08)
		End of boring at 118'		118					
				119					Borehole backfilled upon completion.
				120					

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Run-1
NX CORE
REC=115"/120" =96%
RQD=112"/120" =93%

Project Manhattan District 1/2/5 Garage		Project No. 5700301	
Location New York, NY		Elevation and Datum el 8 BPMD Borough President of Manhattan	
Drilling Agency CMI Subsurface Investigations, Inc.		Date Started 1/10/08	Date Finished 1/14/08
Drilling Equipment Mobile B-61		Completion Depth 115 ft	Rock Depth 105 ft
Size and Type of Bit 3-7/8" Tri-Cone Roller Bit		Number of Samples	Disturbed 26 Undisturbed 0 Core 1
Casing Diameter (in) 4" ID Steel Casing	Casing Depth (ft) 25	Water Level (ft.) First ∇ Completion ∇	24 HR. ∇
Casing Hammer Donut	Weight (lbs) 300 lb	Drop (in) 24"	Drilling Foreman John Imparato
Sampler 2" OD Split Spoon Sampler / NX Core Barrel	Inspecting Engineer Matthew Bryant		
Sampler Hammer Donut	Weight (lbs) 140 lb	Drop (in) 30"	

MATERIAL SYMBOL	Elev. (ft) +8.0	Sample Description	Casing min/r ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. BLU/ft		N-Value (Blows/ft) 10 20 30 40
[Cross-hatched pattern]		Brown c-f SAND, sm. gravel, sm. concrete, tr. brick fragments [FILL](moist) BC: 11-65		0				9		At 2", hit an approx. 2" diameter pipe running NW; move the hole north 1'
				1	S-1	SS	15	12		
		BRICK, CONCRETE, GRAVEL, and SAND [FILL](moist)		2				43		
				3	S-2	SS	10	37		Drill to 5'
				4				28	10	
		Black and brown c-m SAND, BRICK, sm. concrete, sm. gravel [FILL](moist)		5				5		
				6	S-3	SS	12	3		Drill to 7'
				7				35	50/1"	
		Reddish brown c. SAND, BRICK, sm. gravel [FILL](moist)		8	S-4	SS	9	8		
				9				6		Casing to 9' Drill to 10'
				10				5		
		Reddish brown c-m SAND, tr. gravel [FILL](moist)		11	S-5	SS	6	3		
				12				5		Push spon down to 17' and sample 17'-19'
				13	S-6	SS	9	7		
		Reddish brown c-m SAND, tr. gravel [FILL](moist)		14				6		
		No Recovery		15				7		
				16	S-7	SS	0	3		
				17				3		Push casing to 19' Clean hole to 19' w/ 2-7/8" rollerbit
		Reddish brown c. SAND, tr. gravel (1") to black clayey organic SILT (7") [OL] BC: 11-65		18	S-8	SS	8	1		
	No Recovery (gravel in wash)		19				0			
			20	S-9	SS	0	8			

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Project		Project No.									
Manhattan District 1/2/5 Garage		5700301									
Location		Elevation and Datum									
New York, NY		el 8 BPMD Borough President of Manhattan									
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Casing min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. BL/ft		N-Value (Blows/ft)	
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet) BC: 8-65		20	S-9	SS	0	10	10	29	S9 SS sample had gravel in the spoon tip; most likely fell to the bottom when the hole was cleaned Push spoon to 21' and sample 21'-23'
				21				7			
		Reddish brown f. silty SAND to sm. silt, tr. mica [SP/SM](wet)		22	S-10	SS	10	6	10		Casing to 25' Drill to 25' Some rig chatter (gravel from above???) to smooth drilling
				23				4			
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		24							End of day 1/10/08 Start day 1/14/08 Drill to 30'; smooth
				25							
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		26	S-11	SS	9	6	11		Drill to 35'; smooth
				27				5			
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		28							Drill to 40'; smooth
				29							
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		30							Drill to 45'; smooth
				31	S-12	SS	8	5	17		
		Reddish brown m-f SAND, tr. mica [SP](wet)		32							Drill to 45'; smooth
				33							
		Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		34							Drill to 45'; smooth
				35							
		Reddish brown m-f SAND, tr. mica [SP](wet)		36	S-13	SS	23	6	29		Drill to 45'; smooth
				37				17			
		Reddish brown m-f SAND, tr. mica [SP](wet)		38							Drill to 45'; smooth
				39							
		Reddish brown m-f SAND, tr. mica [SP](wet)		40							Drill to 45'; smooth
				41	S-14	SS	16	6	17		
				42							Drill to 45'; smooth
				43							
				44							Drill to 45'; smooth
				45							

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Project		Project No.									
Manhattan District 1/2/5 Garage		5700301									
Location		Elevation and Datum									
New York, NY		el 8 BPMD Borough President of Manhattan									
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recov. (in)	Penetr Resist Bl/ft		N-Value (Blows/R)	
		Reddish brown c-m SAND, tr. mica [SP](wet)	45								
				46	S-15	SS	15	7	9	16	
				47					9		
				48							Drill to 50'; smooth
				49							
			Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)	50					8		
				51	S-16	SS	19	12	8	20	
				52					13		
				53							Drill to 55'; smooth
				54							
			Reddish brown f. SAND, sm. silt to silty, tr. mica [SP/SM]	55					6		
				56	S-17	SS	22	10	6	16	
				57					10		
				58							Drill to 60'; smooth
				59							
			Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)	60					9		
				61	S-18	SS	17	11	10	21	
				62					12		
				63							Drill to 65'; smooth
			64								
		Reddish brown m-f SAND, tr. mica [SP](wet)	65					10			
			66	S-19	SS	20	14	16	30		
			67					15			
			68							Drill to 70'; smooth	
			69								
			70								

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Project		Project No.								
Manhattan District 1/2/5 Garage		5700301								
Location		Elevation and Datum								
New York, NY		el 8 BPMD Borough President of Manhattan								
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. BL/ft		N-Value (Blows/ft)
	70	Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)		S-20	SS	15	6 8 9 10	17		
	71									
	72									
	73	Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		S-21	SS	20	8 10 13 16	23		
	75									
	76									
	77									
	78	Reddish brown f. SAND, tr. silt to silty, tr. mica [SP/SM](wet)		S-22	SS	18	7 14 18 22	32		
	80									
	81									
	82									
	83	Reddish brown f. SAND, tr. silt, tr. mica [SP](wet)		S-23	SS	19	10 11 12 13	23		
	85									
	86									
	87									
	88	Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet)		S-24	SS	19	8 13 16 20	29		
	90									
	91									
	92									
	93									
	94									
	95									

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Drill to 75'; smooth

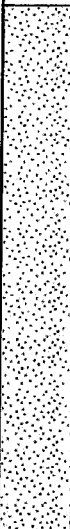

Drill to 80'; smooth

Drill to 85'; smooth

Drill to 90'; smooth

Drill to 95'; smooth

Slow drilling and rig chatter

Project		Project No.									
Manhattan District 1/2/5 Garage		5700301									
Location		Elevation and Datum									
New York, NY		el 8 BPMD Borough President of Manhattan									
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coming min/ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
				Depth Scale	Number	Type	Recov (in)	Penetr. Resist Bl/ft		N-Value (Blows/ft)	
		Reddish brown c. SAND, tr. to sm. gravel [SP](wet) BC: 7-65		95							
				96	S-25	SS	12	11		47	
				97				7			
				98				40			
				99				30			
			Reddish brown f. SAND, tr. to sm. silt, tr. mica [SP/SM](wet) BC: 8-65		100				22		
					101	S-26	SS	17	31		
					102				43		
					103				50		
					104						
	-96.0	BC: 4-65		104							
	-97.0	BC: 1-65		105							
		Black to gray mica schistic GNEISS (coarse banding) w/ garnet intrusions and tr. quartz intrusions, unweathered to fresh, sound w/ moderate fracture spacing, medium to coarse grained [BEDROCK]	5	106							
			5	107							
			3	108							
			5	109							
			6	110	Run-1						
			4	111							
			3	112							
			4	113							
			4	114							
			5	115							
	-107.0	End of boring at 115'		115							
				116							
				117							
				118							
				119							
				120							

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NX CORE
REC=120"/120" =100%
RQD=118"/120" =98%

Project Manhattan District 1/2/5 Garage		Project No. 5700301	
Location New York, NY		Elevation and Datum el 7.5 BPMD Borough President of Manhattan	
Drilling Agency CMI Subsurface Investigations, Inc.		Date Started 1/11/08	Date Finished 1/14/08
Drilling Equipment Mobile B-61 Truck-Mounted Drill Rig		Completion Depth 107 ft	Rock Depth 97 ft
Size and Type of Bit 3-7/8" Tri-Cone Roller Bit		Number of Samples	Disturbed 26
Casing Diameter (in) 4" ID Steel Casing		Casing Depth (ft) 25	Undisturbed 0
Casing Hammer Donut		Weight (lbs) 300 lb	Drop (in) 24"
Sampler 2" OD Split Spoon Sampler / NX Core Barrel		Drilling Foreman Vince Gandolfo	
Sampler Hammer Donut		Weight (lbs) 140 lb	Drop (in) 30"
		Inspecting Engineer Nurhan Ecemis	

MATERIAL SYMBOL	Elev. (ft) +7.9	Sample Description	Casing min / ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. (blows/in)		N-Value (Blows/ft) 10 20 30 40
		Black c. GRAVEL and BRICK [FILL](dry) BC: 11-65		0				2		Start drilling (1/11/08) at 10:00 am
		Gray f-c GRAVEL, sm. brick, sm. c-m sand. [FILL](dry)		1	S-1	SS	2	6	12	
		Gray f-c GRAVEL, sm. brick, sm. m. sand. [FILL](dry)		2				5		39
		Gray f-c GRAVEL, sm. brick, sm. m. sand. [FILL](dry)		3	S-2	SS	8	28		
		Red BRICK, sm. concrete, sm. m. sand, tr. f. gravel. [FILL](dry)		4				11		Refusal
		Red BRICK, sm. concrete, sm. m. sand, tr. f. gravel. [FILL](dry)		5	S-3	SS	6	5		
		Reddish brown c-f SAND, sm. f. gravel, tr. brick [FILL](wet)		6	S-4	SS	10	2		Drive casing to 10' Drill to 10' Hard drilling from 7-10' Concrete observed in wash
		Reddish brown c-f SAND, sm. f. gravel, tr. brick. [FILL](wet)		7				4		
		Reddish brown c-f SAND, sm. f. gravel, tr. brick. [FILL](wet)		8				18		odor observed
		Reddish brown c-f SAND, sm. f. gravel, tr. brick. [FILL](wet)		9	S-5	SS	6	4	8	
		Brown c-m SAND, sm. f. gravel, tr. brick. [FILL](moist)		10				4		odor observed
		Brown c-m SAND, sm. f. gravel, tr. brick. [FILL](moist)		11	S-6	SS	10	7	14	
		No Recovery		12				9		Drive casing to 15' Drill to 16'
		No Recovery		13	S-7	SS	14	7	18	
		C-m SAND, sm. black clayey organic SILT [FILL](wet)		14				10		5
		C-m SAND, sm. black clayey organic SILT [FILL](wet)		15	S-8	SS	0	3	6	
				16				13		2
				17	S-9	SS	16	3	5	
				18				2		
				19				4		
				20				3		

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Project		Project No.								
Manhattan District 1/2/5 Garage		5700301								
Location		Elevation and Datum								
New York, NY		el 7.5 BPMD Borough President of Manhattan								
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Casing (mm/ft)	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. BL/ft		N-Value (Blows/ft)
[Cross-hatched pattern]		WOOD and black clayey organic SILT [FILL](wet)		20				3	10 20 30 40	Drive casing to 20' Drill to 20' Light brown wash
		Black to brown m. SAND, sm. wood, tr. f. gravel [FILL](wet)		21	S-10	SS	10	2		
				22				1		Drive casing to 25' Drill to 25'
				23	S-11	SS	5	25	39	
				24				14		Drive casing to 25' Drill to 25'
				25				10		
				26	S-12	SS	14	6		Drive casing to 25' Drill to 25'
				27				4		
				28				6		Drive casing to 25' Drill to 25'
				29				7		
				30				10		Drive casing to 25' Drill to 25'
				31	S-13	SS	20	5		
				32				9		Drive casing to 25' Drill to 25'
				33				11		
				34				13		Drive casing to 25' Drill to 25'
				35				20		
				36	S-14	SS	20	8		Drive casing to 25' Drill to 25'
				37				9		
				38				11		Drive casing to 25' Drill to 25'
				39				15		
				40				8		Drive casing to 25' Drill to 25'
				41	S-15	SS	18	10		
				42				10		Drive casing to 25' Drill to 25'
				43				10		
				44				13		Drive casing to 25' Drill to 25'
				45				13		

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Project		Project No.											
Manhattan District 1/2/5 Garage		5700301											
Location		Elevation and Datum											
New York, NY		el 7.5 BPMD Borough President of Manhattan											
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min/ft	Sample Data						Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)			
				Depth Scale	Number	Type	Recon (in)	Penetr. resist BL/in	N-Value (Blows/ft)				
		Reddish brown c-m SAND, tr. mica [SP](wet)		45									
				46	S-16	SS	16	9	18			Drill to 50'	
				47				9					
				48				9					
				49				9					
			Reddish brown c-f SAND, sm. silt, tr. mica [SP/SM](wet)		50				9				
					51	S-17	SS	14	10	20			Drill to 55'
					52				10				
					53				10				
					54				12				
			Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)		55				7				
					56	S-18	SS	18	8	21			Drill to 60'
					57				13				
					58				13				
					59								
			Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)		60				6				
					61	S-19	SS	17	8	25			
					62				17				
					63				27				Stopped due to weather at 1:30 pm (1/11/08) Started at 8:50 am (1/14/08) Drill to 65' Smooth drilling Reddish brown wash
					64								
		Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)		65				4					
				66	S-20	SS	20	9	20			Drill to 70'	
				67				11					
				68				10					
				69									
				70									

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Project		Project No.							
Manhattan District 1/2/5 Garage		5700301							
Location		Elevation and Datum							
New York, NY		el 7.5 BPMD Borough President of Manhattan							
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coming in ft	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				Depth Scale	Number	Type	Recov. (in)	Penetr. resist. Blows/in	
	70	Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)	70				8		28*
	71		S-21	SS	12	15	13		
	72					20			
	73	Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)	73						29*
	74								
	75		S-22	SS	13	15	14		
	76					20			50*
	77								
	78								
	79	Reddish brown m-f SAND, tr. silt, tr. mica [SP/SM](wet)	79						43*
	80								
	81		S-23	SS	13	14	21		
	82					29	34		38*
	83								
	84								
	85	Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)	85				10		38*
	86		S-24	SS	11	19	24		
	87					29			
	88	Reddish brown f. SAND, sm. silt, tr. mica [SM](wet)	88						38*
	89								
	90		S-25	SS	11	13	17		
	91					21	30		38*
	92								
	93								
	94								38*
95									

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Project		Project No.								
Manhattan District 1/2/5 Garage		5700301								
Location		Elevation and Datum								
New York, NY		el 7.5 BPMD Borough President of Manhattan								
MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring min ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
					Number	Type	Recov. (in)	Penetr. resist. BL/in		N-Value (Blows/ft)
		Reddish brown c-m SAND, tr. f. gravel, tr. silt, tr. mica, tr. decomposed rock [SP](wet)		95						
				96	S-26	SS	17	23		
	-89.3 -89.5	BC: 4-65		97				26		Drill to 97'. Heavy rig chatter at 96.5' Start core at 10:30 am REC=120"/120"=100% RQD=120"/120"=100%
		Black gray GNEISSIC-SCHIST, hard sound rock, tr. garnet intrusions, unweathered, tr. mica [BEDROCK] BC: 1-65		98				35		
				99				100/3"		
				100						
				101						
				102						
				103						
				104						
				105						
				106						
	-89.5	End of Boring at 107' 0"		107						End core at 12:25pm (1/14/08) Observation well installed on 1/14/2008
				108						
				109						
				110						
				111						
				112						
				113						
				114						
				115						
				116						
				117						
				118						
				119						
				120						

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APPENDIX B

Flood Insurance Rate Map

HUDSON COUN
NEW YORK COUN
CITY OF NEW YORK

EL 10

Pier
ZONE X

ZONE AE
(EL 10)

Pier

ZONE X

Pier
ZONE X
Holland Tunnel

Site

ZONE AE
(EL 10)

ZONE X

Pier

WEEHAWKEN ST
WEST STREET
MORTON ST
LEROY ST
CLARKSON
WASHINGTON STREET
GREENWICH STREET
WATT'S STREET
DESBROSSES STREET
VESTRY STREET
CANAL STREET
HUBERT ST
BEACH STREET

City of
New York
360497

ZONE X

BARROWS

MORTON ST

LEROY ST

CLARKSON

ZONE X

ZONE X

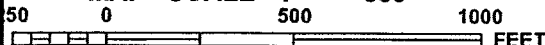
HUBERT ST

BEACH STREET

Flood insurance is available in this community, contact your National Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'



METCO



PANEL 0182F

FIRM

FLOOD INSURANCE RATE MAP

CITY OF
**NEW YORK,
 NEW YORK**
 BRONX, RICHMOND, NEW YORK,
 QUEENS, AND KINGS COUNTIES

PANEL 182 OF 457

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NEW YORK, CITY OF	360497	0182	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
 3604970182F

MAP REVISED
 SEPTEMBER 5, 2007

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX C

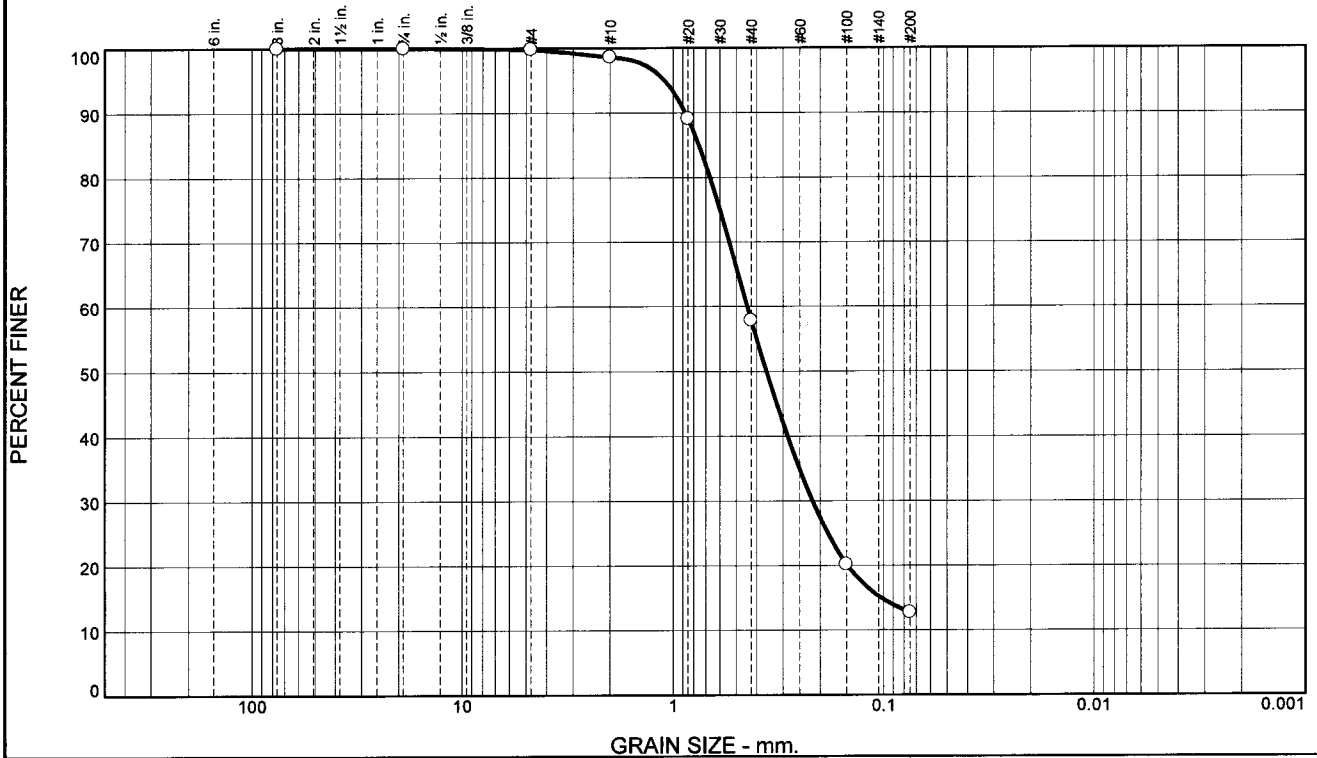
Record of Boring, July 2013

APPENDIX D

Geotechnical Laboratory Test Results, June 2013

SOIL TESTING

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	1.2	40.8	45.1	12.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	99.8		
#10	98.6		
#20	89.1		
#40	57.8		
#100	20.2		
#200	12.7		

Material Description
Silty sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.8762 D₈₅= 0.7557 D₆₀= 0.4440
 D₅₀= 0.3603 D₃₀= 0.2176 D₁₅= 0.1027
 D₁₀= C_u= C_c=

Classification
 USCS= SM AASHTO=

Remarks
 As received moisture content=20.1%
 Fines classification and description based on
 Visual Manual Procedure ASTM D2488

* (no specification provided)

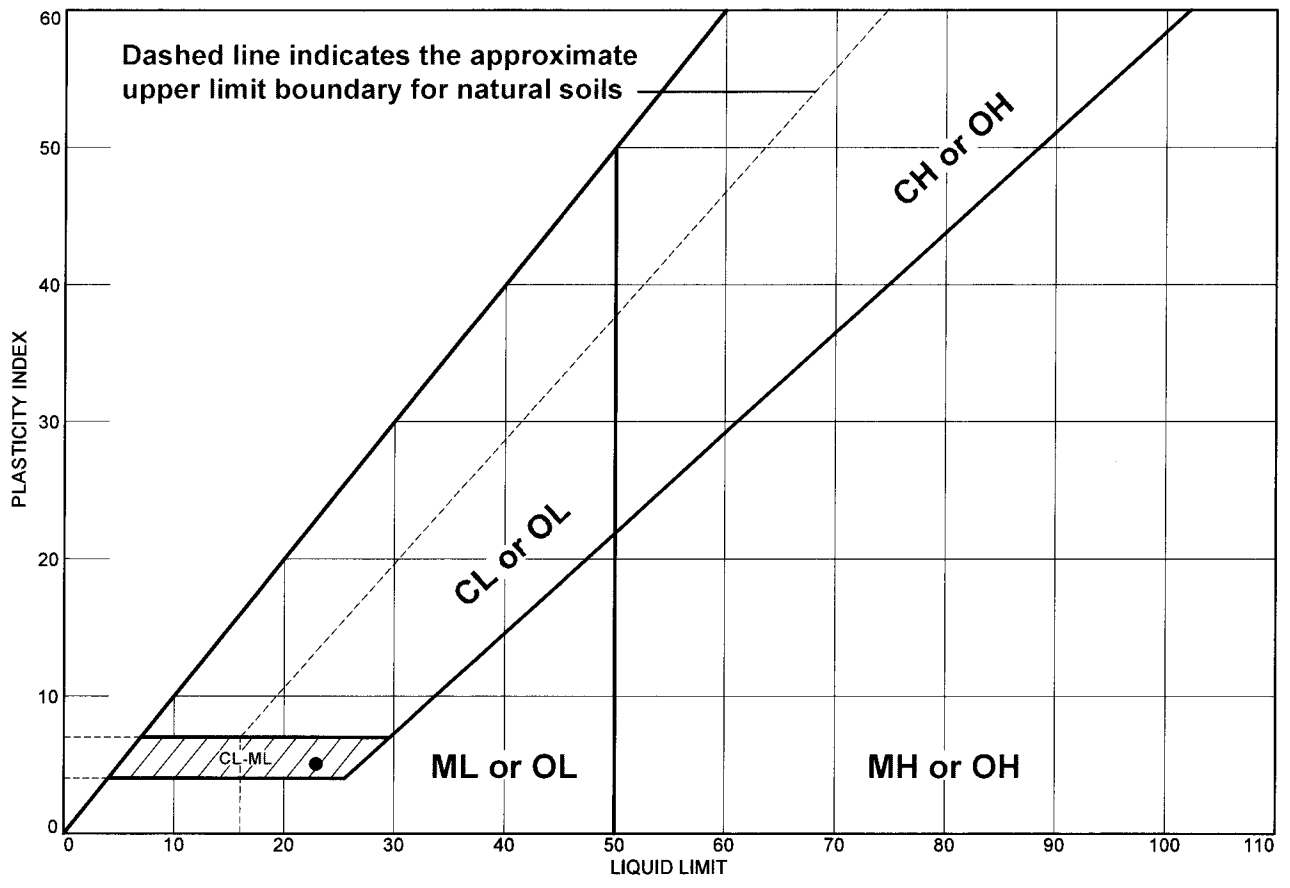
Source of Sample: B-1 Depth: 14-16
 Sample Number: S-5

Date: 6/11/2013

CDM Smith Cambridge, Massachusetts	Client: New York City DDC Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041) Project No: 117520. Figure
---	---

Tested By: BFM Checked By: AT

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● Silty clay	23	18	5			CL-ML

Project No. 117520 **Client:** New York City DDC
Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)
● Source of Sample: B-1 **Depth:** 30-32 **Sample Number:** S-7

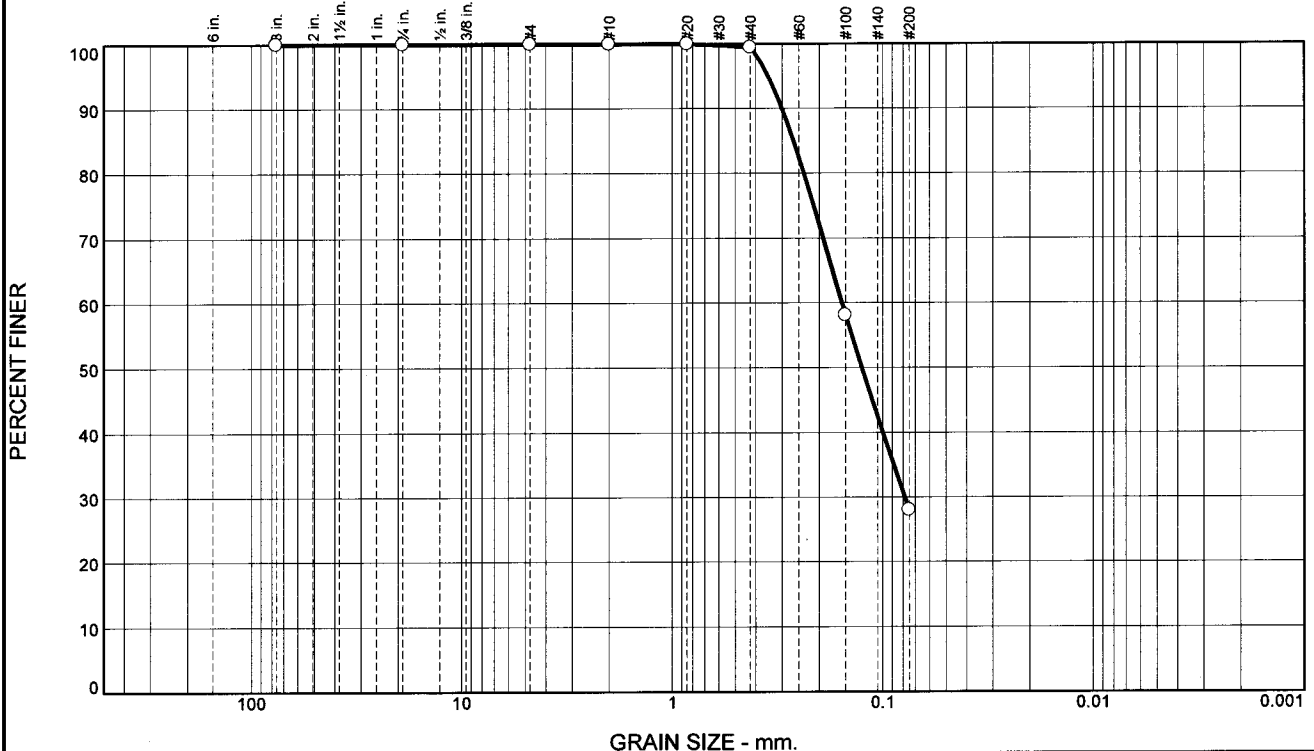
CDM Smith
Cambridge, Massachusetts

Remarks:
 ● As received moisture content=30.4%

Figure

Tested By: NE **Checked By:** MR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	71.5	28.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.5		
#100	58.1		
#200	28.0		

Material Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 0.3013 D₈₅= 0.2657 D₆₀= 0.1561

D₅₀= 0.1257 D₃₀= 0.0787 D₁₅=

D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=26.2%

Fines classification and description based on Visual Manual Procedure ASTM D2488

* (no specification provided)

Source of Sample: B-1 Depth: 50-52
 Sample Number: S-11

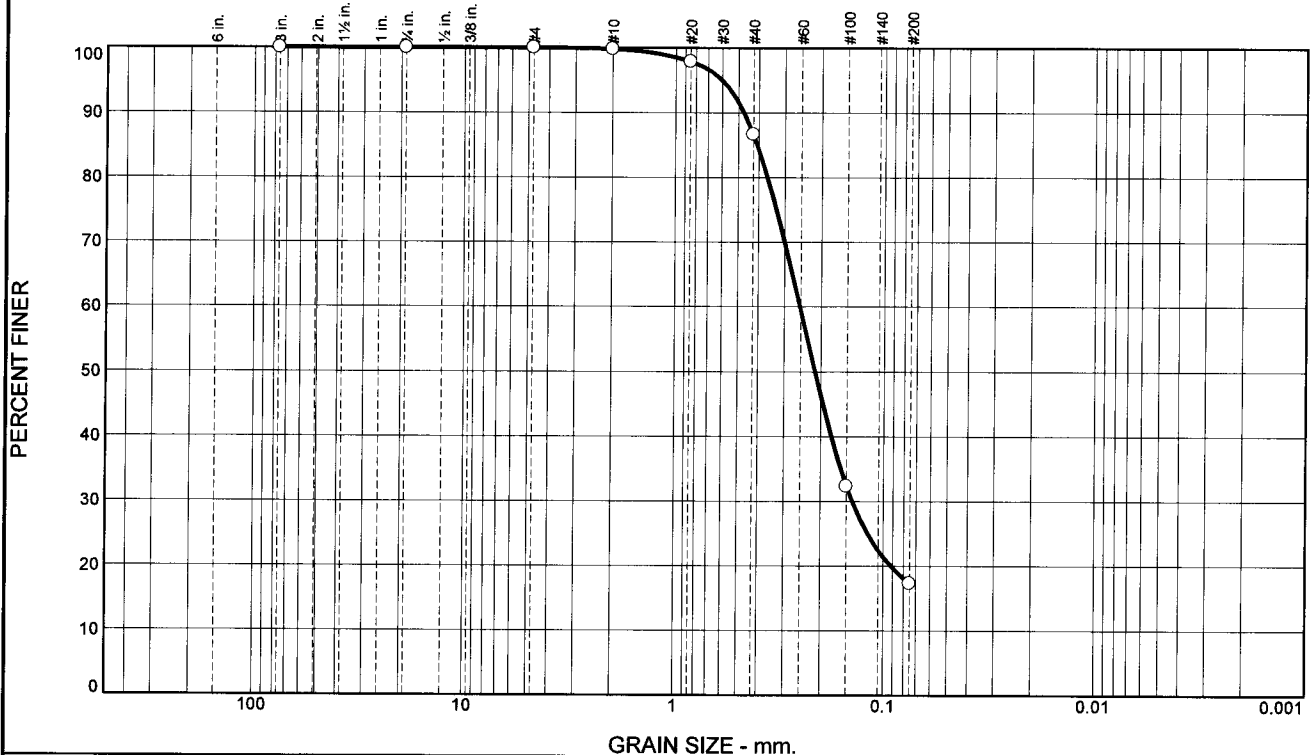
Date: 6/12/2013

<p>CDM Smith</p> <p>Cambridge, Massachusetts</p>	<p>Client: New York City DDC</p> <p>Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)</p> <p>Project No: 117520.</p> <p style="text-align: right;">Figure</p>
--	--

Tested By: BFM

Checked By: AT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	13.2	69.3	17.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	100.0		
#10	99.8		
#20	97.9		
#40	86.6		
#100	32.3		
#200	17.3		

Material Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 0.4719 D₈₅= 0.4075 D₆₀= 0.2531
D₅₀= 0.2135 D₃₀= 0.1411 D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=19.2%
Fines classification and description based on
Visual Manual Procedure ASTM D2488

* (no specification provided)

Source of Sample: B-1 Depth: 90-92
Sample Number: S-19

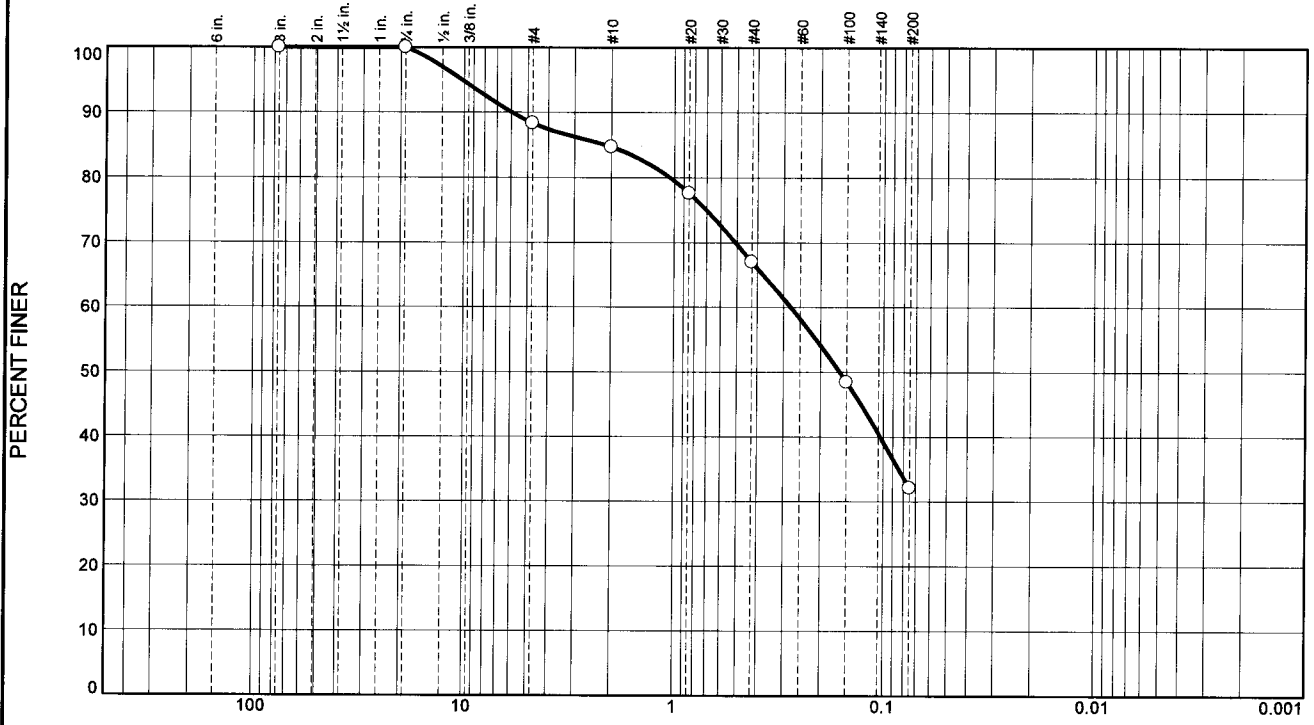
Date: 6/12/2013

<p style="text-align: center; font-weight: bold; font-size: 1.2em;">CDM Smith</p> <p style="text-align: center; font-weight: bold;">Cambridge, Massachusetts</p>	<p>Client: New York City DDC</p> <p>Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)</p> <p>Project No: 117520.</p> <p style="text-align: right;">Figure</p>
--	--

Tested By: BFM

Checked By: AT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.7	3.6	17.7	35.0	32.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	88.3		
#10	84.7		
#20	77.6		
#40	67.0		
#100	48.4		
#200	32.0		

Material Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 5.9689 D₈₅= 2.1428 D₆₀= 0.2780

D₅₀= 0.1618 D₃₀= D₁₅=

D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=15.2%

Fines classification and description based on Visual Manual Procedure ASTM D2488

* (no specification provided)

Source of Sample: B-2 Depth: 6-8
 Sample Number: S-1

Date: 6/13/2013

<p style="text-align: center; font-weight: bold; font-size: 1.2em;">CDM Smith</p> <p style="text-align: center; font-weight: bold; font-size: 1.2em;">Cambridge, Massachusetts</p>	<p>Client: New York City DDC</p> <p>Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)</p> <p>Project No: 117520.</p> <p style="text-align: right;">Figure</p>
--	--

Tested By: BFM Checked By: AT

CDM Smith
Geotechnical Engineering Laboratory

**Standard Test Method for Moisture, Ash, and Organic Matter of Peat and
Other Organic Soils(ASTM D2974)**

Client: NYC DDC
Project Name: Demolition of Existing District 1 Garage
Project Location: Manhattan, NY
Project Number: _____
Sample Number: S-8
Sample Location: B-2
Sample Depth (ft): 30-30.4
Sample Date: 6/13/2013
Lab ID Number: _____

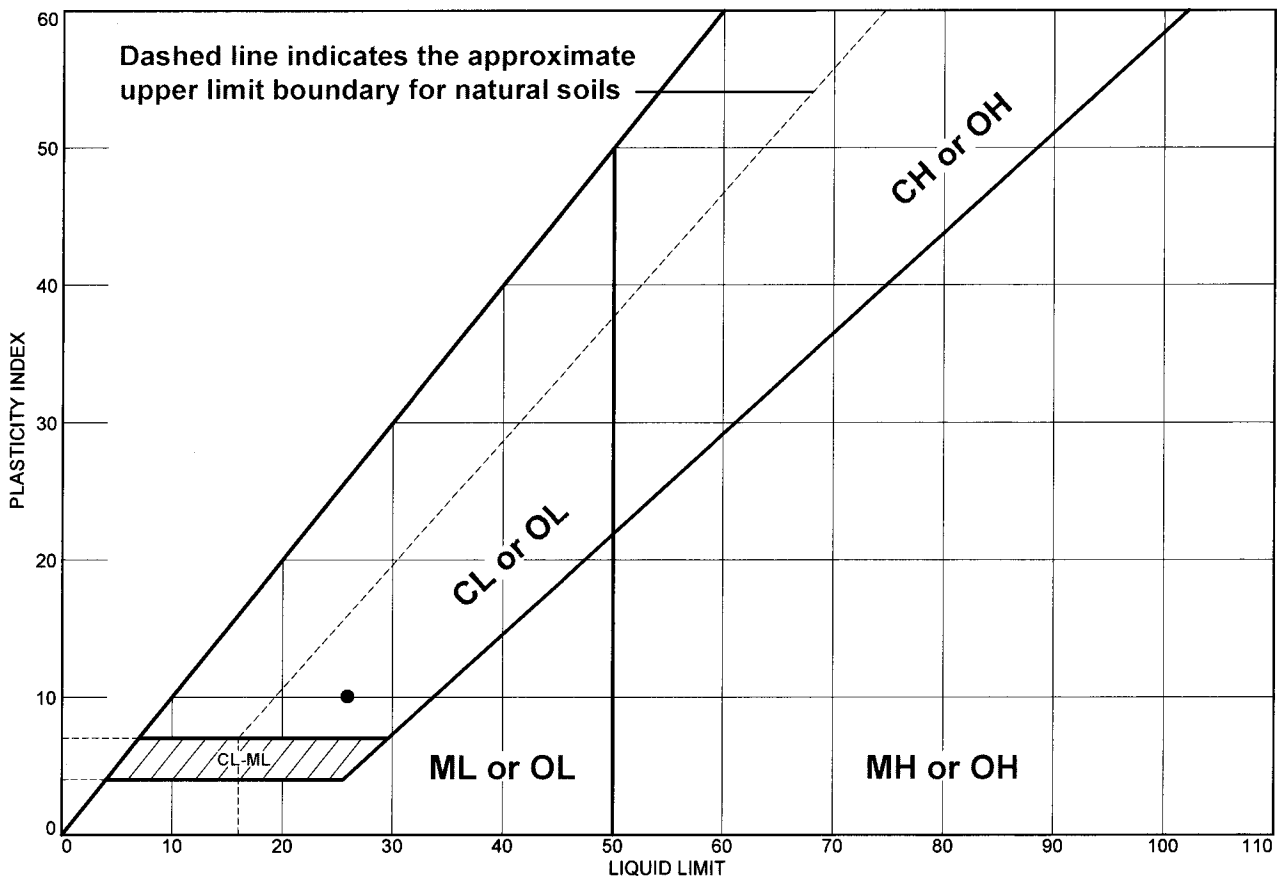
Tested By: BFM
Test Date: 6/13/2013

Procedure: C
Temperature: 440 °C

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	98.24
Wet Mass of Sample & Tin (g)	149.98
Dry Mass of Sample & Tin (g)	138.64
Mass of Water (g)	11.3
Mass of Dry Soil (g)	40.4
Moisture Content (%)	28.1

ASH CONTENT	
Porcelain Dish Mass (g)	98.2
Porcelain Dish + Oven Dried Soil (g)	150.0
Mass of Oven Dried Soil (g)	40.4
Mass of Dish & Burned Soil (g)	138.4
Mass of Burned Soil (g)	40.2
Mass of Organic Material (g)	11.5
Ash Content (%)	99.5
Organic Content (%)	0.5

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● Lean clay	26	16	10			CL

Project No. 117520. **Client:** New York City DDC
Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)
● Source of Sample: B-2 **Depth:** 35-37 **Sample Number:** S-9

CDM Smith
Cambridge, Massachusetts

Remarks:
● As received moisture content=32.5%

Figure

Tested By: NE **Checked By:** MR

CDM Smith
Geotechnical Engineering Laboratory

**Standard Test Method for Moisture, Ash, and Organic Matter of Peat and
Other Organic Soils(ASTM D2974)**

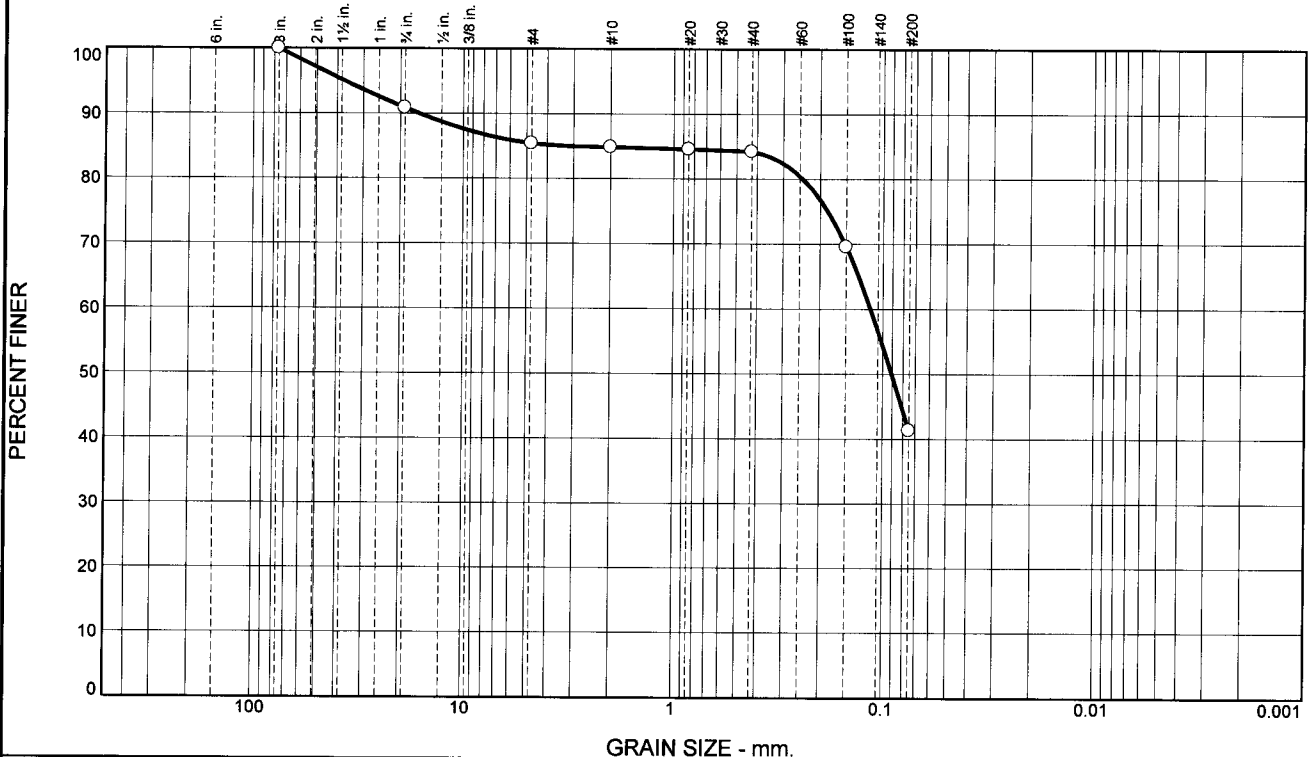
Client: NYC DDC
Project Name: Demolition of Existing District 1 Garage
Project Location: Manhattan, NY
Project Number: _____
Sample Number: S-9
Sample Location: B-2
Sample Depth (ft): 35-37
Sample Date: 6/13/2013
Lab ID Number: _____

Tested By: BFM
Test Date: 6/13/2013
Procedure: C
Temperature: 440 °C

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	97.37
Wet Mass of Sample & Tin (g)	132.35
Dry Mass of Sample & Tin (g)	123.77
Mass of Water (g)	8.6
Mass of Dry Soil (g)	26.4
Moisture Content (%)	32.5

ASH CONTENT	
Porcelain Dish Mass (g)	97.4
Porcelain Dish + Oven Dried Soil (g)	132.4
Mass of Oven Dried Soil (g)	26.4
Mass of Dish & Burned Soil (g)	123.6
Mass of Burned Soil (g)	26.2
Mass of Organic Material (g)	8.8
Ash Content (%)	99.2
Organic Content (%)	0.8

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.1	5.5	0.6	0.6	42.9	41.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	90.9		
#4	85.4		
#10	84.8		
#20	84.5		
#40	84.2		
#100	69.5		
#200	41.3		

Material Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 16.3441 D₈₅= 3.2019 D₆₀= 0.1150
D₅₀= 0.0909 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=25.1%
Fines classification and description based on
Visual Manual Procedure ASTM D2488

* (no specification provided)

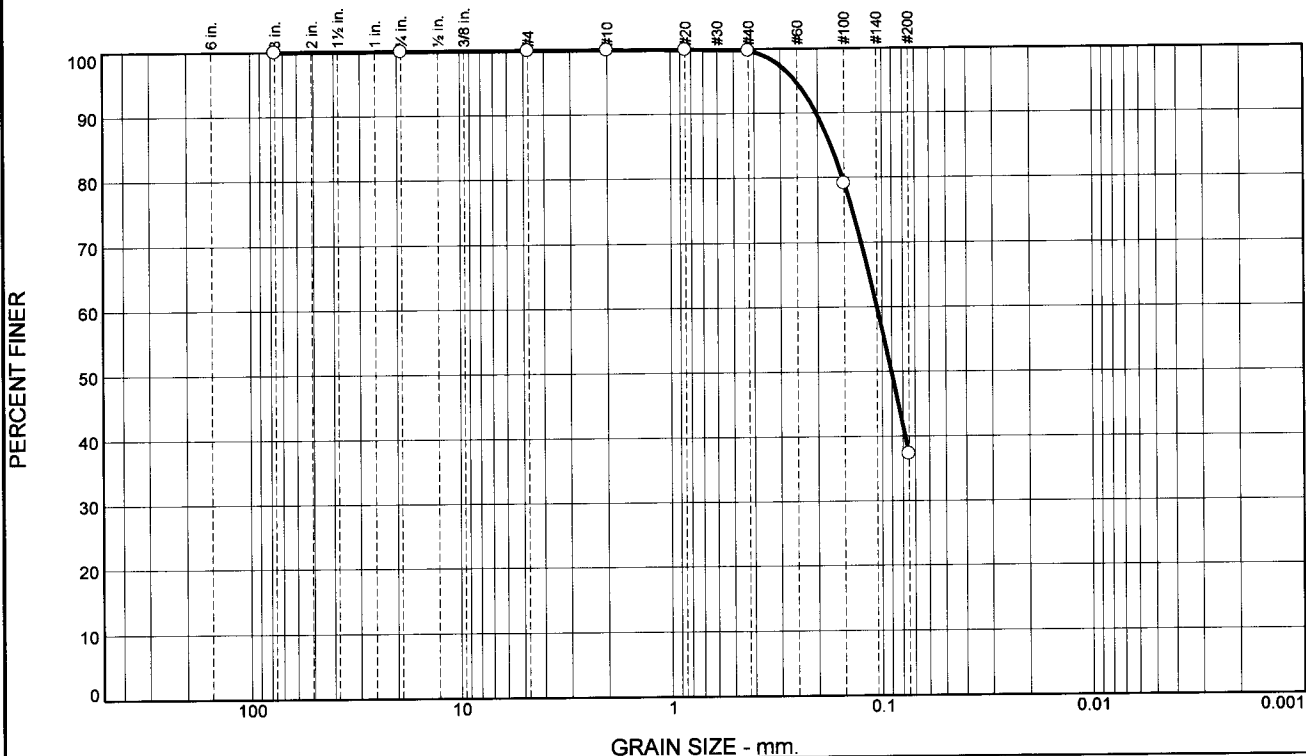
Source of Sample: B-2 Depth: 40-42
Sample Number: S-10

Date: 6/13/2013

<p>CDM Smith</p> <p>Cambridge, Massachusetts</p>	<p>Client: New York City DDC</p> <p>Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)</p> <p>Project No: 117520.</p> <p style="text-align: right;">Figure</p>
--	--

Tested By: BFM Checked By: AT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	62.5	37.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.8		
#100	79.0		
#200	37.3		

Material Description
Silty sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.2035 D₈₅= 0.1738 D₆₀= 0.1059
 D₅₀= 0.0906 D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= SM AASHTO=

Remarks
 As received moisture content=25.3%
 Fines classification and description based on
 Visual Manual Procedure ASTM D2488

* (no specification provided)

Source of Sample: B-2 Depth: 65-67
 Sample Number: S-15

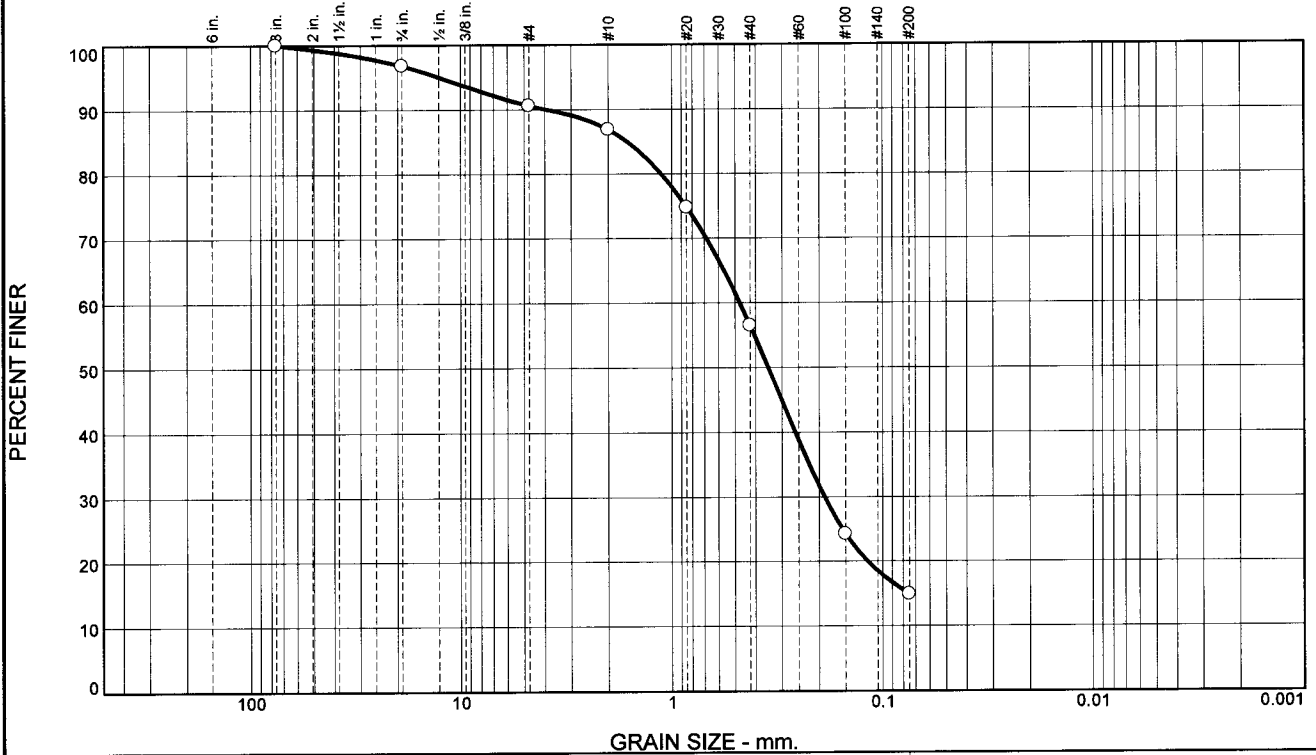
Date: 6/14/2013

CDM Smith Cambridge, Massachusetts	Client: New York City DDC Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041) Project No: 117520. Figure
---	---

Tested By: BFM

Checked By: AT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.2	6.2	3.7	30.4	41.6	14.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	96.8		
#4	90.6		
#10	86.9		
#20	74.8		
#40	56.5		
#100	24.2		
#200	14.9		

Material Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 3.9225 D₈₅= 1.6354 D₆₀= 0.4757

D₅₀= 0.3487 D₃₀= 0.1886 D₁₅= 0.0756

D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=15.3%

Fines classification and description based on Visual Manual Procedure ASTM D2488

* (no specification provided)

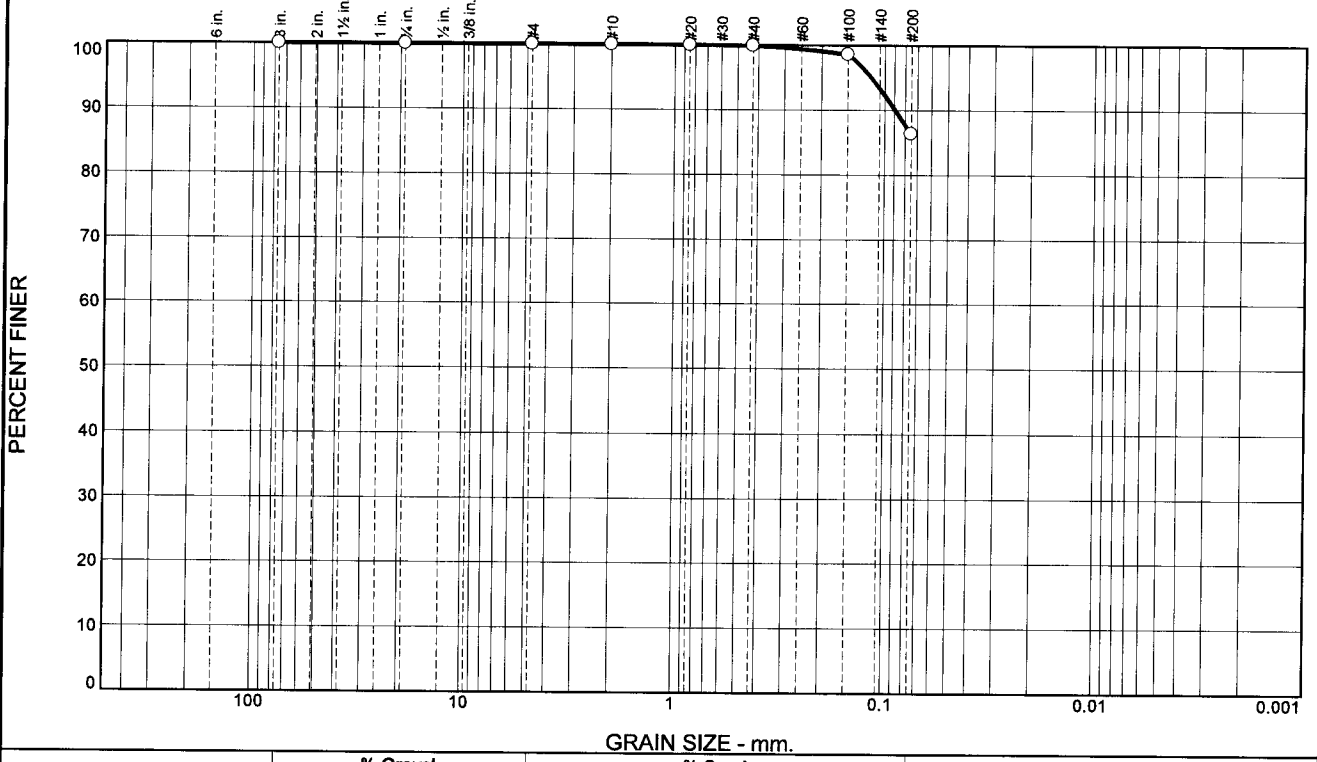
Source of Sample: B-3 Depth: 8-10
 Sample Number: S-2

Date: 6/14/2013

<p>CDM Smith</p> <p>Cambridge, Massachusetts</p>	<p>Client: New York City DDC</p> <p>Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)</p> <p>Project No: 117520.</p> <p style="text-align: right;">Figure</p>
--	--

Tested By: BFM Checked By: AT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	13.6	86.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.9		
#100	98.6		
#200	86.3		

Material Description

Silt

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.0894 D₈₅= D₆₀=
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= ML AASHTO=

Remarks
 As received moisture content=29.8%
 Fines classification and description based on
 Visual Manual Procedure ASTM D2488

* (no specification provided)

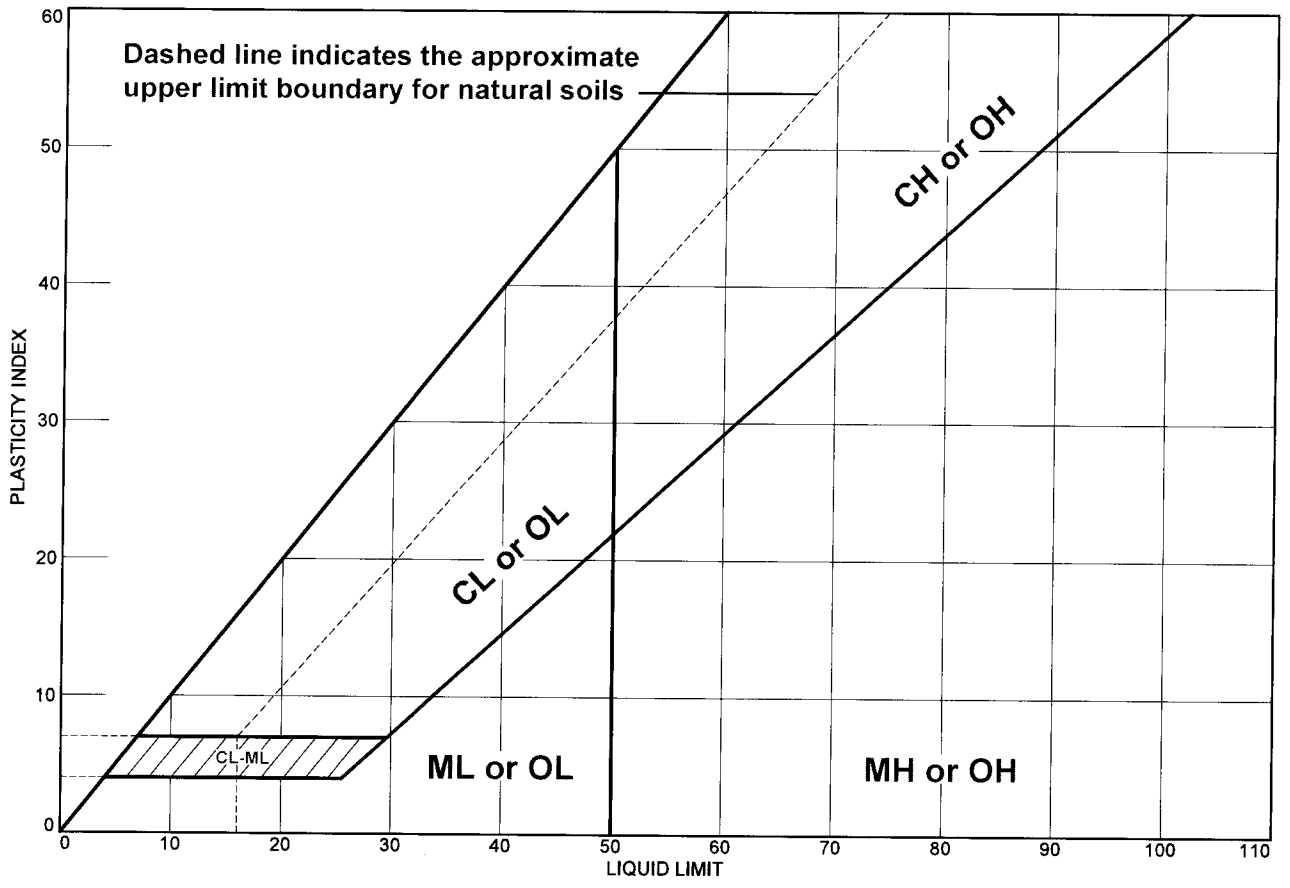
Source of Sample: B-3 Depth: 20-22
 Sample Number: S-6

Date: 6/14/2013

CDM Smith Cambridge, Massachusetts	Client: New York City DDC Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041) Project No: 117520. Figure
---	---

Tested By: BFM Checked By: AT

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
Silt	NV	NP	NP			ML

Project No. 117520 **Client:** New York City DDC
Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)
Source of Sample: B-3 **Depth:** 70-72 **Sample Number:** S-16

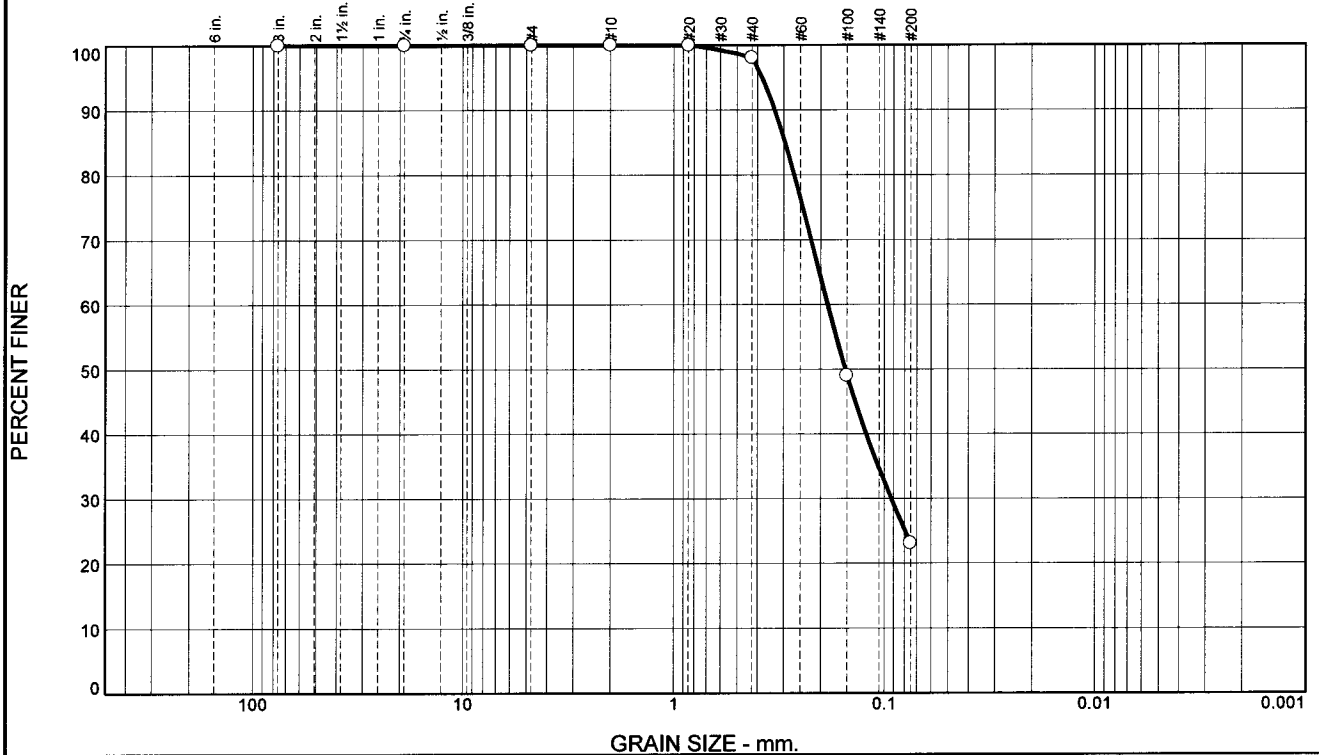
CDM Smith
Cambridge, Massachusetts

Remarks:
 ● As received moisture content=26.4%
 Sample slides in bowl

Figure

Tested By: NE **Checked By:** MR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.0	74.9	23.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	98.0		
#100	49.0		
#200	23.1		

Material Description
Silty sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.3320 D₈₅= 0.2968 D₆₀= 0.1856
 D₅₀= 0.1531 D₃₀= 0.0927 D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= SM AASHTO=

Remarks
 As received moisture content=21.2%
 Fines classification and description based on
 Visual Manual Procedure ASTM D2488

* (no specification provided)

Source of Sample: B-3 Depth: 80-82
 Sample Number: S-18

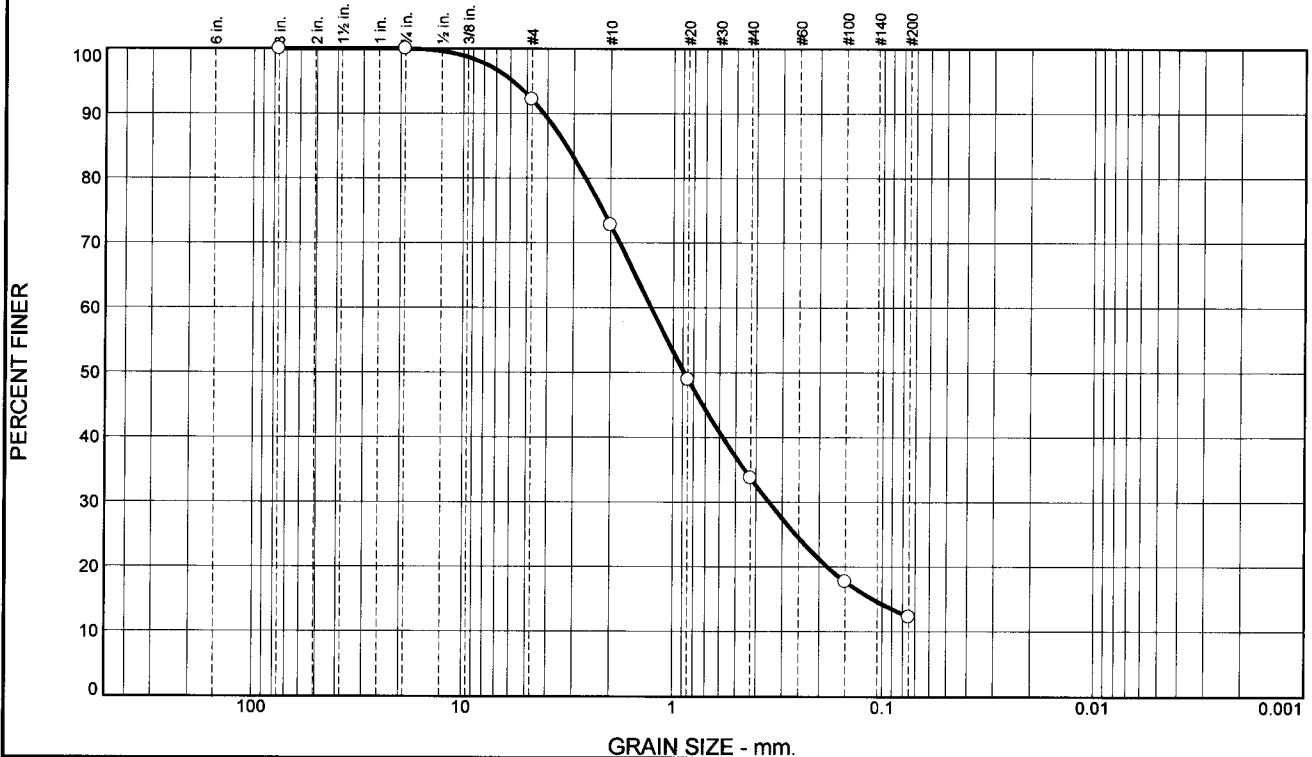
Date: 6/17/2013

CDM Smith Cambridge, Massachusetts	Client: New York City DDC Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041) Project No: 117520. Figure
---	---

Tested By: BFM

Checked By: AT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.8	19.5	38.9	21.5	12.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	92.2		
#10	72.7		
#20	48.9		
#40	33.8		
#100	17.7		
#200	12.3		

Material Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 4.1690 D₈₅= 3.2549 D₆₀= 1.2770
D₅₀= 0.8865 D₃₀= 0.3476 D₁₅= 0.1112
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=9.7%
Fines classification and description based on
Visual Manual Procedure ASTM D2488

* (no specification provided)

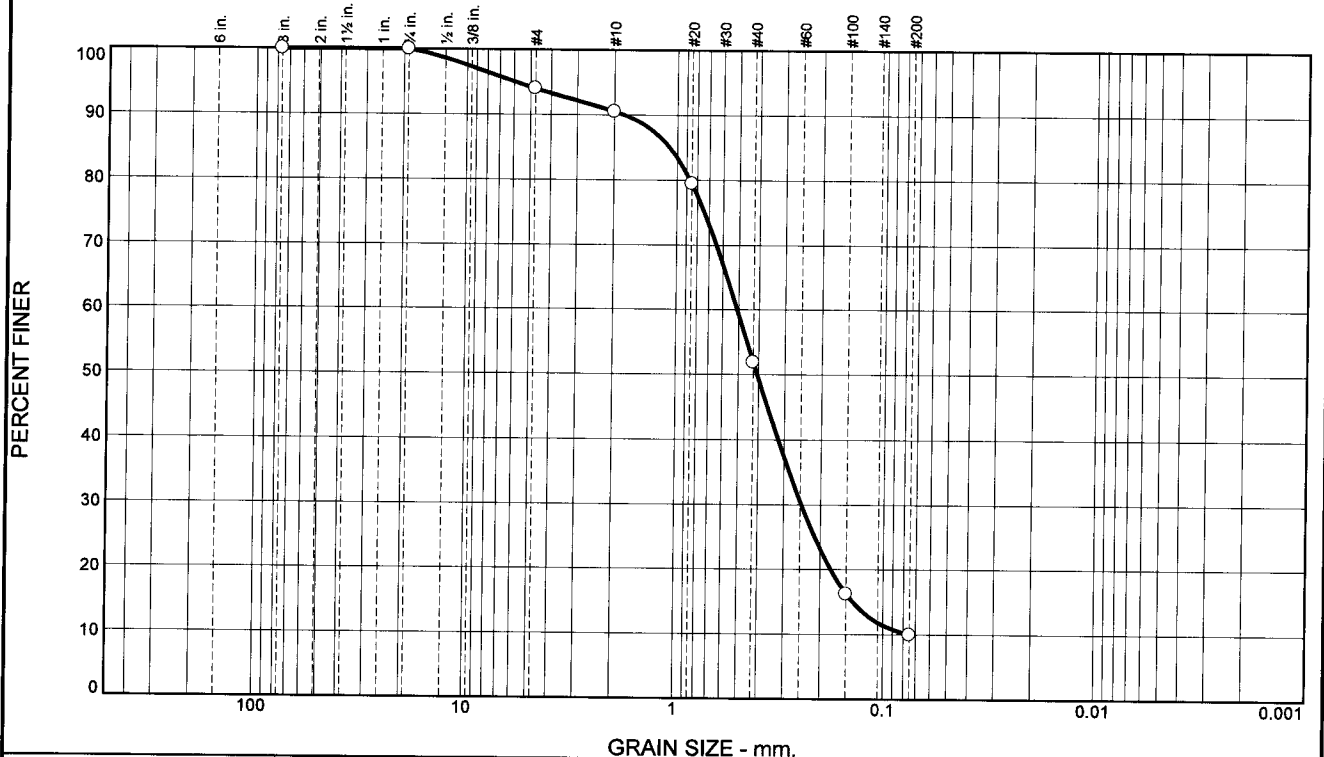
Source of Sample: B-3 Depth: 91-92
Sample Number: S-20B

Date: 6/17/2013

<p>CDM Smith</p> <p>Cambridge, Massachusetts</p>	<p>Client: New York City DDC</p> <p>Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)</p> <p>Project No: 117520.</p> <p style="text-align: right;">Figure</p>
--	--

Tested By: BFM Checked By: AT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.0	3.5	38.6	41.9	10.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	94.0		
#10	90.5		
#20	79.4		
#40	51.9		
#100	16.2		
#200	10.0		

Material Description

Well-graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 1.8017 D₈₅= 1.0896 D₆₀= 0.5102
D₅₀= 0.4069 D₃₀= 0.2472 D₁₅= 0.1398
D₁₀= 0.0756 C_u= 6.75 C_c= 1.58

Classification

USCS= SW-SM AASHTO=

Remarks

As received moisture content=21.3%
Fines classification and description based on
Visual Manual Procedure ASTM D2488

* (no specification provided)

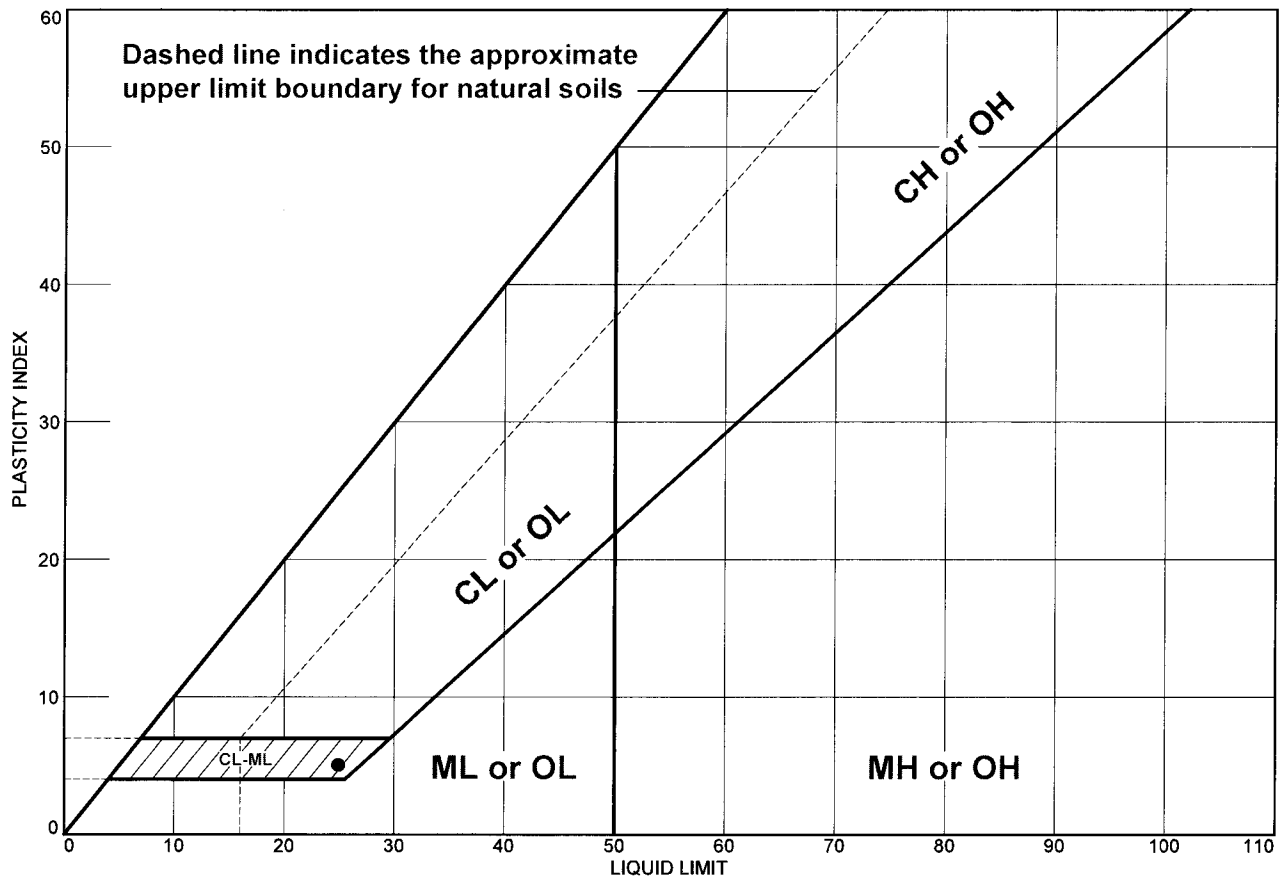
Source of Sample: B-4 Depth: 12-14
Sample Number: S-4

Date: 6/10/2013

<p style="text-align: center; font-weight: bold; font-size: 1.2em;">CDM Smith</p> <p style="text-align: center; font-weight: bold; font-size: 1.2em;">Cambridge, Massachusetts</p>	<p>Client: New York City DDC</p> <p>Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)</p> <p>Project No: 117520.</p> <p style="text-align: right;">Figure</p>
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Tested By: BFM Checked By: AT

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● Silty clay	25	20	5			CL-ML

Project No. 117520. **Client:** New York City DDC
Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041)
● Source of Sample: B-4 **Depth:** 60-62 **Sample Number:** S-14

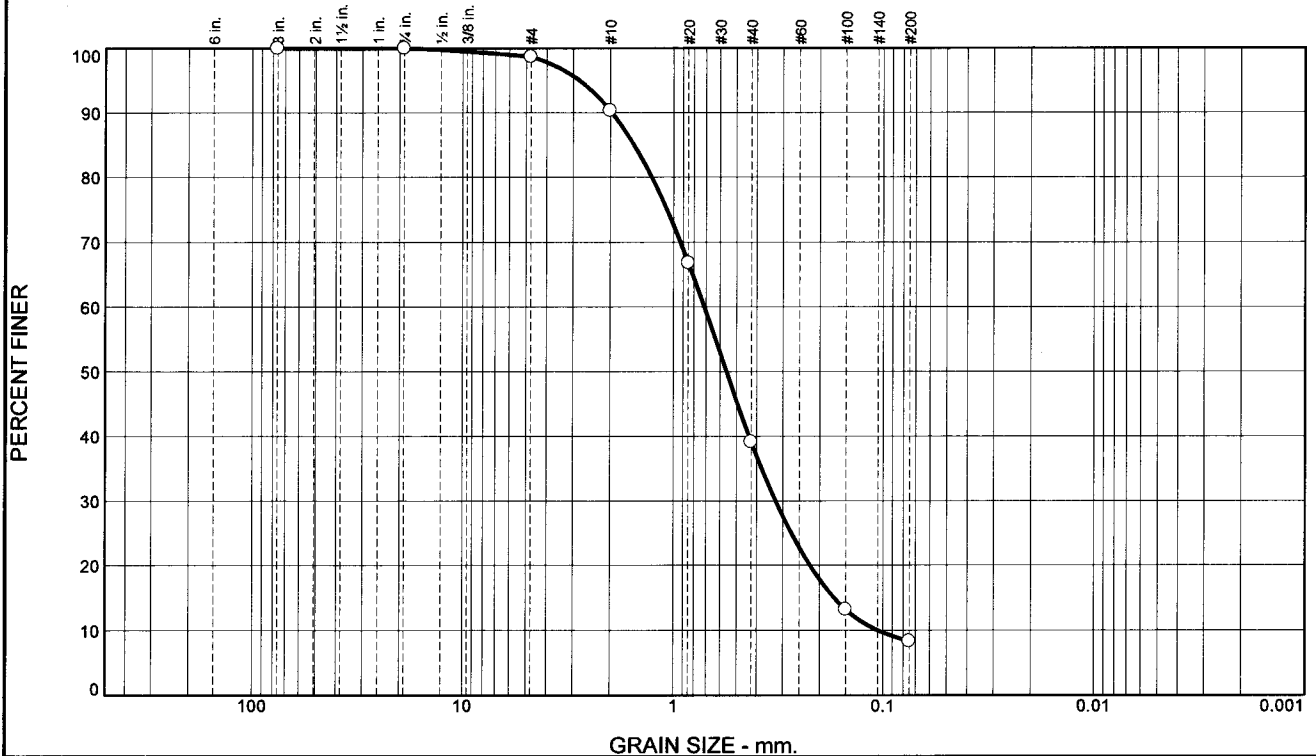
CDM Smith
Cambridge, Massachusetts

Remarks:
 ● As received moisture content=28.4%

Figure

Tested By: NE **Checked By:** MR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	8.4	51.2	30.8	8.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	98.7		
#10	90.3		
#20	66.8		
#40	39.1		
#100	13.2		
#200	8.3		

Material Description
Well-graded sand with silt

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 1.9666 D₈₅= 1.5460 D₆₀= 0.7145
 D₅₀= 0.5597 D₃₀= 0.3249 D₁₅= 0.1708
 D₁₀= 0.1057 C_u= 6.76 C_c= 1.40

Classification
 USCS= SW-SM AASHTO=

Remarks
 As received moisture content=14.5%
 Fines classification and description based on
 Visual Manual Procedure ASTM D2488

* (no specification provided)

Source of Sample: B-4 Depth: 85-87
 Sample Number: S-19

Date: 6/11/2013

CDM Smith Cambridge, Massachusetts	Client: New York City DDC Project: Demolition of Existing District 1 Garage, Manhattan (Task ID# 9041) Project No: 117520. Figure
---	---

Tested By: BFM Checked By: AT

ROCK TESTING



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	06/28/13
Tested By:	daa
Checked By:	mpd

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D 7012 Method C**

Boring ID	Sample ID	Depth, ft	Bulk Density, lb/ft ³	Compressive Strength, psi	Failure Type	In conformance with ASTM D 4543
B-1	C-1	101.32-101.69	175	6,552	2	YES
B-1	C-3	113.89-114.26	170	15,786	2	YES
B-1	C-4	116.50-116.87	173	8,335	2	NO*

- Notes:
- Density determined on core samples by measuring dimensions and weight and then calculating.
 - All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 - Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure (See attached photographs)
 - * The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.



EXPRESS

Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ...
 GTX #: 300666
 Boring ID: B-1
 Sample ID: C-1
 Depth: 101.32-101.69 ft
 Visual Description: See photographs

Test Date: 6/27/2013
 Tested By: daa
 Checked By: mpd

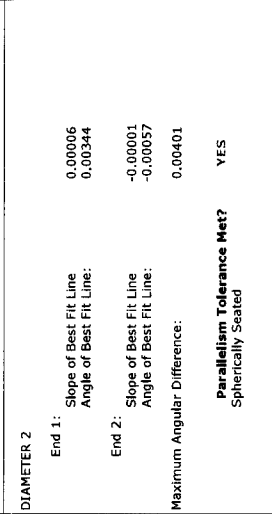
UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY		2		Average
Specimen Length, in:	4.34	4.35	4.35	4.35
Specimen Diameter, in:	1.99	1.99	1.99	1.99
Specimen Mass, g:	621.99			
Bulk Density, lb/ft ³ :	175			
Length to Diameter Ratio:	2.2			

END FLATNESS AND PARALLELISM (Procedure FP1)		2		Average
END 1				
Diameter 1, in	-0.875	-0.750	-0.375	-0.250
Diameter 2, in (rotated 90°)	-0.00020	-0.00020	-0.00010	-0.00010
Diameter 2, in (rotated 90°)	-0.00030	-0.00030	-0.00020	-0.00010
END 2				
Diameter 1, in	-0.875	-0.750	-0.375	-0.250
Diameter 2, in (rotated 90°)	-0.00020	-0.00020	-0.00010	-0.00010
Diameter 2, in (rotated 90°)	-0.00030	-0.00030	-0.00020	-0.00010

DEVIATION FROM STRAIGHTNESS (Procedure S1)		2		Average
Maximum gap between side of core and reference surface plate: Is the maximum gap ≤ 0.02 in.? YES				
Maximum difference must be < 0.020 in.				
Straightness Tolerance Met? YES				
Difference between max and min readings, in: 0° = 0.00020 90° = 0.00040				
Flatness Tolerance Met? YES				

PERPENDICULARITY (Procedure P1)		2		Average
(Calculated from End Flatness and Parallelism measurements above)				
END 1				
Diameter 1, in	0.00020	1.990	0.00010	0.006
Diameter 2, in (rotated 90°)	0.00040	1.990	0.00020	0.012
END 2				
Diameter 1, in	0.00020	1.990	0.00010	0.006
Diameter 2, in (rotated 90°)	0.00040	1.990	0.00020	0.012



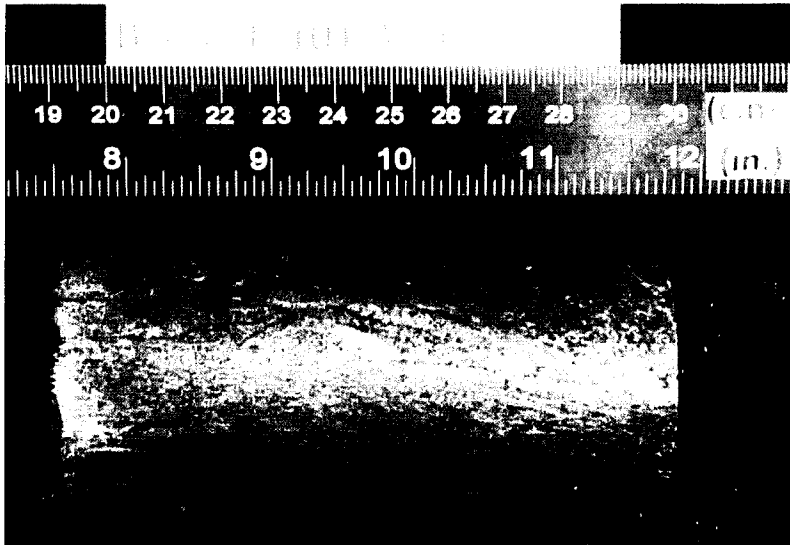
PARALLELISM TOLERANCE MET?		2		Average
Spherically Seated				
Parallelism Tolerance Met? YES				

PERPENDICULARITY TOLERANCE MET?		2		Average
Spherically Seated				
Perpendicularity Tolerance Met? YES				

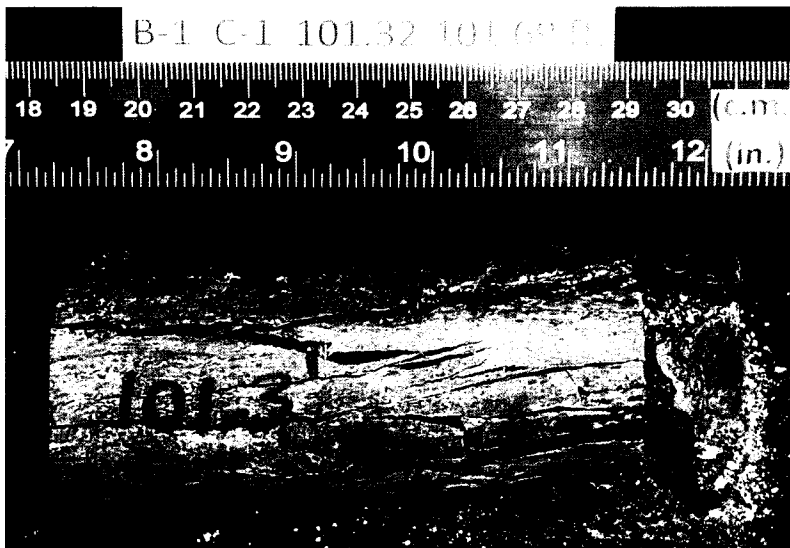
PERPENDICULARITY TOLERANCE MET?		2		Average
Spherically Seated				
Perpendicularity Tolerance Met? YES				



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	6/28/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-1
Sample ID:	C-1
Depth, ft:	101.32-101.69



After cutting and grinding



After break



EXPRESS

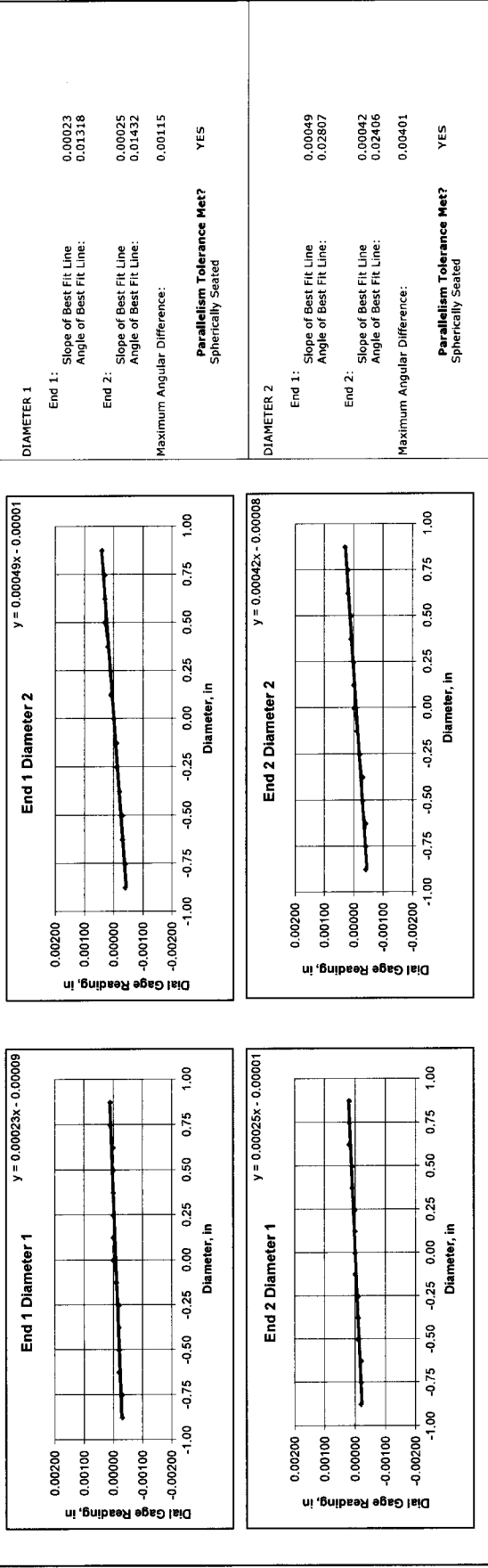
Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Boring ID: B-1
 Sample ID: C-3
 Depth: 113.89-114.26 ft
 Visual Description: See photographs

Test Date: 6/25/2013
 Tested By: daa
 Checked By: mpd

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY		DEVIATION FROM STRAIGHTNESS (Procedure S1)	
Specimen Length, in:	4.26	Average	4.26
Specimen Diameter, in:	1.99	Maximum gap between side of core and reference surface plate:	0.02 in.?
Specimen Mass, g:	590.78	Is the maximum gap \leq 0.02 in.?	YES
Bulk Density, lb/ft ³ :	170	Maximum difference must be $<$ 0.020 in.	
Length to Diameter Ratio:	2:1	90° = 0.00040	90° = 0.00080

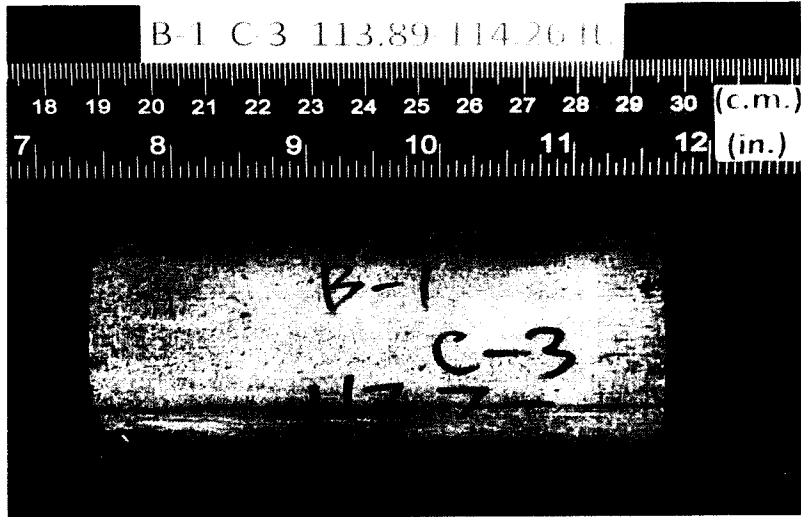
END FLATNESS AND PARALLELISM (Procedure FP1)		Straightness Tolerance Met?	
END 1			YES
Diameter 1, in	-0.875	0.375	0.625
Diameter 2, in (rotated 90°)	-0.00030	0.00000	0.00010
Diameter 1, in	-0.750	0.00000	0.00030
Diameter 2, in (rotated 90°)	-0.00040	0.00010	0.00020
END 2			YES
Diameter 1, in	-0.875	0.375	0.625
Diameter 2, in (rotated 90°)	-0.00030	0.00000	0.00010
Diameter 1, in	-0.750	0.00000	0.00030
Diameter 2, in (rotated 90°)	-0.00040	0.00010	0.00020



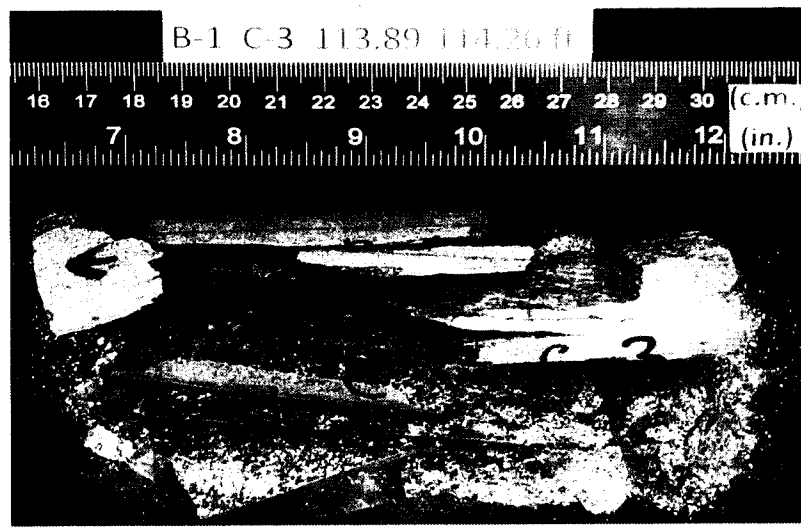
PERPENDICULARITY (Procedure P1)		Perpendicularity Tolerance Met?	
END 1			YES
Diameter 1, in	0.00040	0.012	0.023
Diameter 2, in (rotated 90°)	0.00080	0.012	0.020
END 2			YES
Diameter 1, in	0.00040	0.012	0.020
Diameter 2, in (rotated 90°)	0.00070	0.012	0.020



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	6/28/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-1
Sample ID:	C-3
Depth, ft:	113.89-114.26



After cutting and grinding



After break



E X P R E S S

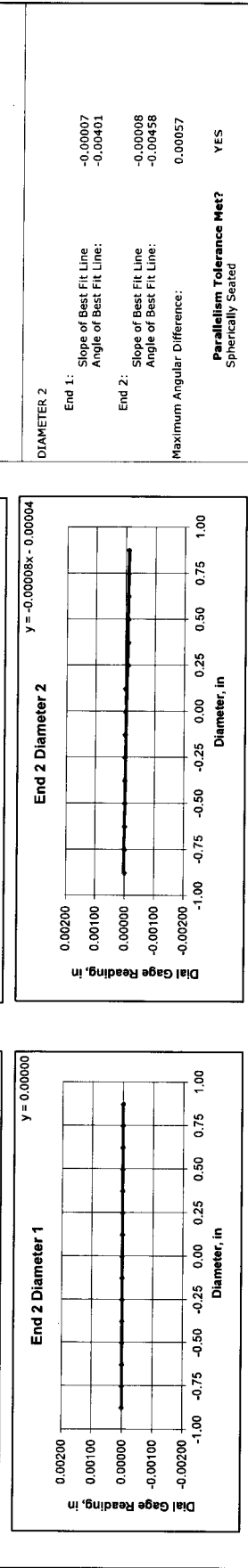
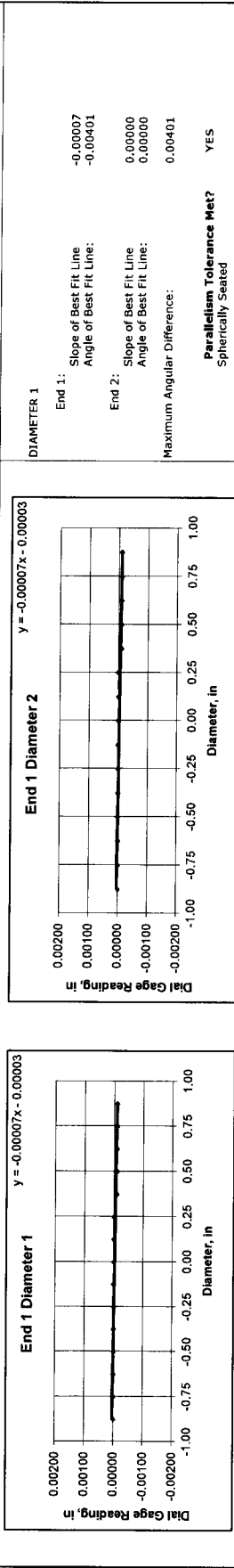
Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300656
 Boring ID: B-1
 Sample ID: C-4
 Depth: 116.50-116.87 ft
 Visual Description: See photographs

Test Date: 6/27/2013
 Tested By: daa
 Checked By: mpd

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY		DEVIATION FROM STRAIGHTNESS (Procedure S1)	
Specimen Length, in:	4.21	Average	
Specimen Diameter, in:	1.99	4.21	
Specimen Mass, g:	595.75	1.99	
Bulk Density, lb/ft ³ :	173		
Length to Diameter Ratio:	2.1		
		Minimum Diameter Tolerance Met?	YES
		Length to Diameter Ratio Tolerance Met?	YES

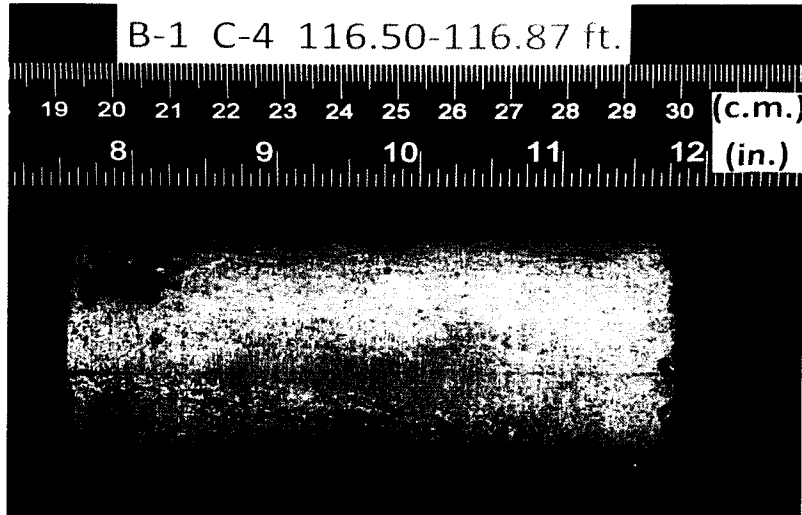
END FLATNESS AND PARALLELISM (Procedure FP1)		STRAIGHTNESS TOLERANCE MET?	
END 1			
Diameter 1, in	-0.875	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000
END 2			
Diameter 1, in	-0.875	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000



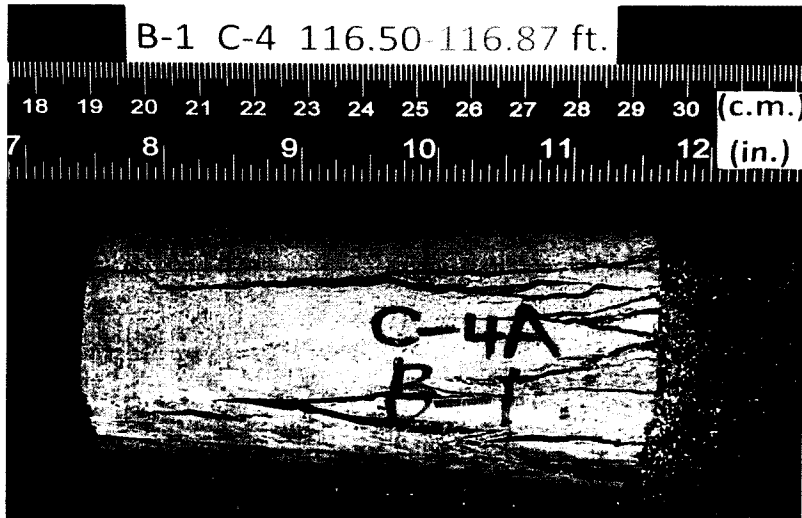
PERPENDICULARITY (Procedure P1)		PERPENDICULARITY TOLERANCE MET?	
END 1			
Diameter 1, in	0.00010	0.00005	0.003
Diameter 2, in (rotated 90°)	0.00010	0.00005	0.003
END 2			
Diameter 1, in	0.00000	0.00000	0.000
Diameter 2, in (rotated 90°)	0.00010	0.00005	0.003



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	6/28/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-1
Sample ID:	C-4
Depth, ft:	116.50-116.87



After cutting and grinding



After break



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	07/03/13
Tested By:	daa
Checked By:	mpd

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D 7012 Method C**

Boring ID	Sample ID	Depth, ft	Bulk Density, lb/ft ³	Compressive Strength, psi	Failure Type	In conformance with ASTM D 4543
B-2	C-1	96.60-96.97	169	14,589	1	YES
B-2	C-2	102.90-103.27	171	13,442	1	YES
B-2	C-3	110.16-110.53	170	4,673	2	YES

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.
 All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure (See attached photographs)



Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Boring ID: B-2
 Sample ID: C-1
 Depth: 96.60-96.97 ft
 Visual Description: See photographs

Test Date: 7/2/2013
 Tested By: daa
 Checked By: mpd

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY		2		Average	
Specimen Length, in:	4.30	4.30	4.30	4.30	4.30
Specimen Diameter, in:	1.99	1.99	1.99	1.99	1.99
Specimen Mass, g:	596.14				
Bulk Density, lb/ft ³ :	169				
Length to Diameter Ratio:	2.2				

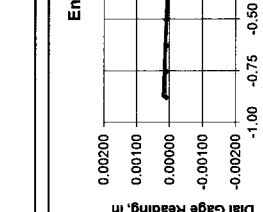
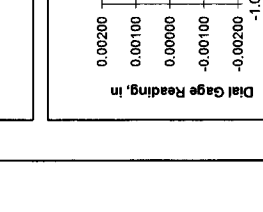
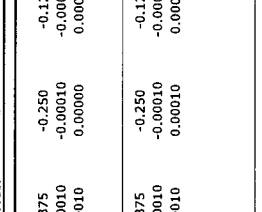
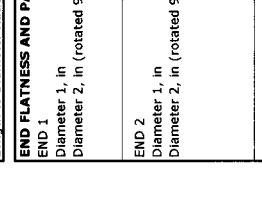
END FLATNESS AND PARALLELISM (Procedure FP1)		Minimum Diameter Tolerance Met?		Length to Diameter Ratio Tolerance Met?		YES		YES	
END 1	-0.875	-0.750	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250
Diameter 1, in	-0.00020	-0.00020	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000
END 2	-0.875	-0.750	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250
Diameter 1, in	-0.00020	-0.00020	-0.00020	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00000	0.00000	-0.00010

END FLATNESS AND PARALLELISM (Procedure FP1)		Minimum Diameter Tolerance Met?		Length to Diameter Ratio Tolerance Met?		YES		YES	
END 1	-0.875	-0.750	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250
Diameter 1, in	-0.00020	-0.00020	-0.00020	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00000	0.00000	-0.00010

DEVIATION FROM STRAIGHTNESS (Procedure S1)		Maximum gap between side of core and reference surface plate: Is the maximum gap \leq 0.02 in.?	
0° =	0.00020	90° =	0.00040
Maximum difference must be $<$ 0.020 in.	YES	Maximum difference must be $<$ 0.020 in.	YES

PERPENDICULARITY (Procedure P1)		Perpendicularity Tolerance Met?	
END 1	0.00020	0.0006	YES
Diameter 1, in	0.00040	0.012	YES
Diameter 2, in (rotated 90°)			
END 2	0.00020	0.006	YES
Diameter 1, in	0.00040	0.012	YES
Diameter 2, in (rotated 90°)			

PARALLELISM TOLERANCE MET?		Spherically Seated	
DIAMETER 1	0.00013	0.00745	YES
End 1:	Slope of Best Fit Line	0.00014	0.00802
End 2:	Angle of Best Fit Line	0.00057	
Maximum Angular Difference:			
DIAMETER 2	-0.00021	-0.01203	YES
End 1:	Slope of Best Fit Line	-0.00024	-0.01375
End 2:	Angle of Best Fit Line	0.00172	
Maximum Angular Difference:			

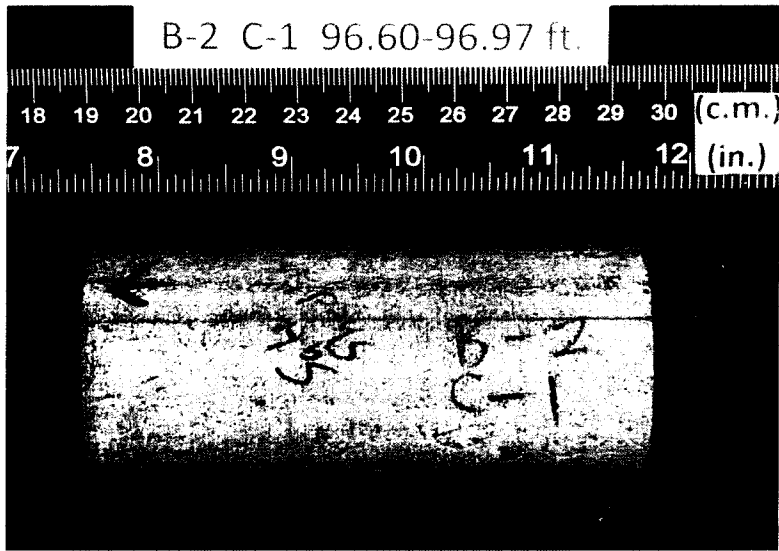


Maximum angle of departure must be \leq 0.25°
 Perpendicularity Tolerance Met? YES

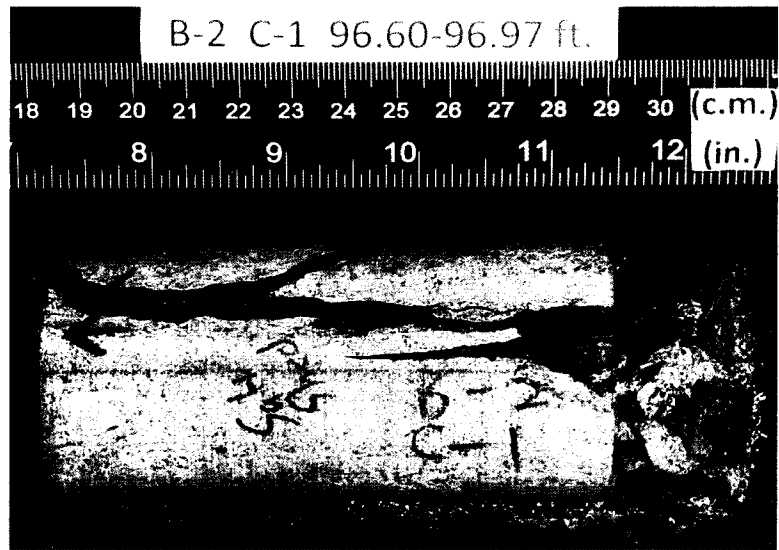
Maximum angle of departure must be \leq 0.25°
 Perpendicularity Tolerance Met? YES



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	7/3/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-2
Sample ID:	C-1
Depth, ft:	96.60-96.97



After cutting and grinding



After break



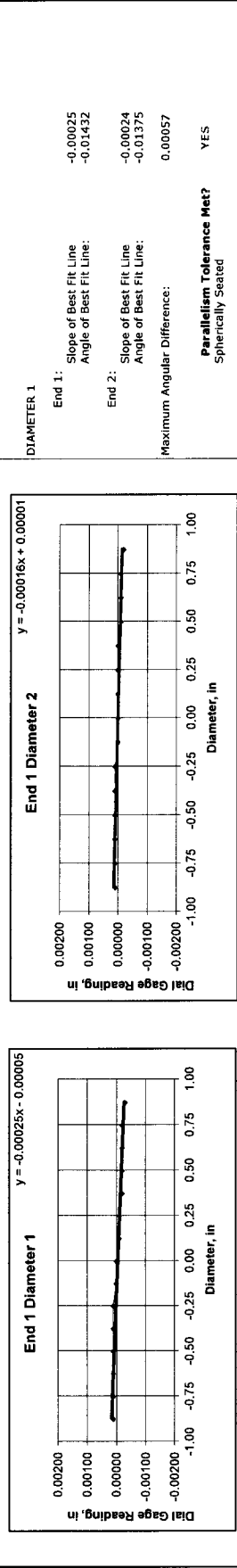
Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ...
 GTX #: 300666
 Boring ID: B-2
 Sample ID: C-2
 Depth: 102.90-103.27 ft
 Visual Description: See photographs

Test Date: 7/2/2013
 Tested By: daa
 Checked By: mpd

UNIT WEIGHT DETERMINATION AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY		Average	
Specimen Length, in:	2	4.30	4.30
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	603.31		
Bulk Density, lb/ft ³ :	171		
Length to Diameter Ratio:	2.2		

END FLATNESS AND PARALLELISM (Procedure FP1)		Minimum Diameter Tolerance Met?		Length to Diameter Ratio Tolerance Met?		Average		Maximum gap between side of core and reference surface plate:		Straightness Tolerance Met?				
END 1	-0.875	-0.750	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00010	0.00010	0.00010	0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00020	-0.00020	-0.00020	-0.00030
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	-0.00020
END 2	-0.875	-0.750	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00020	-0.00020	-0.00030	-0.00040
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00030

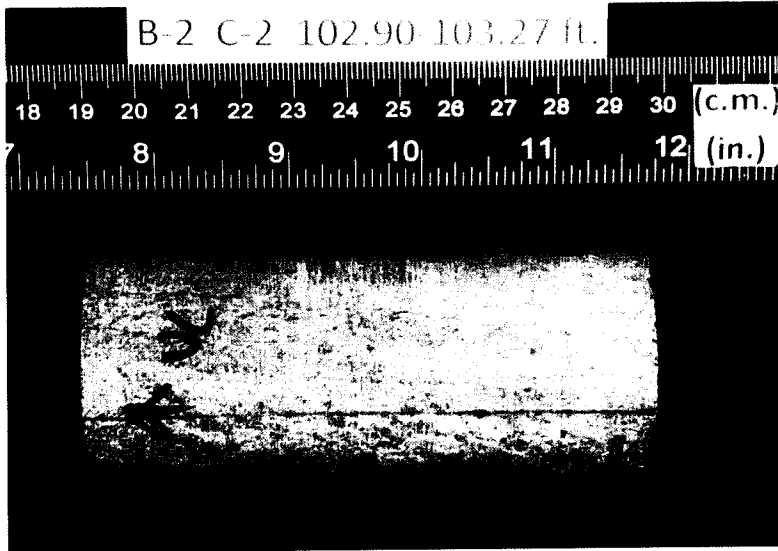


PERPENDICULARITY (Procedure P1)		Perpendicularity Tolerance Met?		Angle°		Slope		Maximum angle of departure must be ≤ 0.25°		Perpendicularity Tolerance Met?	
END 1	0.00040	0.00040	0.00040	0.012	0.012	0.00020	0.012	YES	YES	YES	YES
Diameter 1, in	0.00030	0.00030	0.00015	0.009	0.009	0.00015	0.009	YES	YES	YES	YES
Diameter 2, in (rotated 90°)	0.00050	0.00050	0.014	0.014	0.014	0.00025	0.014	YES	YES	YES	YES
Diameter 2, in (rotated 90°)	0.00040	0.00040	0.012	0.012	0.012	0.00020	0.012	YES	YES	YES	YES

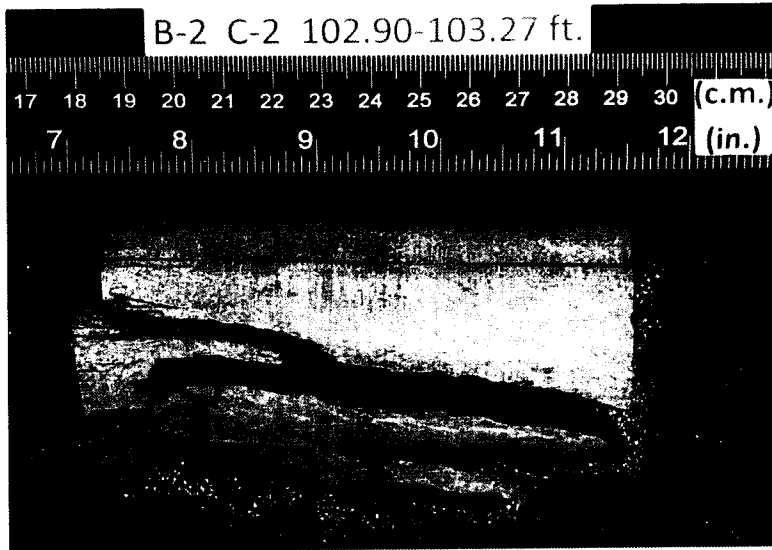
PARALLELISM TOLERANCE MET?		Sphericity Sealed?	
DIAMETER 1	End 1: Slope of Best Fit Line: -0.00025, Angle of Best Fit Line: -0.01432	End 2: Slope of Best Fit Line: -0.00024, Angle of Best Fit Line: -0.01375	Maximum Angular Difference: 0.00057
DIAMETER 2	End 1: Slope of Best Fit Line: -0.00016, Angle of Best Fit Line: -0.00917	End 2: Slope of Best Fit Line: -0.00023, Angle of Best Fit Line: -0.01318	Maximum Angular Difference: 0.00401



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	7/3/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-2
Sample ID:	C-2
Depth, ft:	102.90-103.27



After cutting and grinding



After break



E X P R E S S

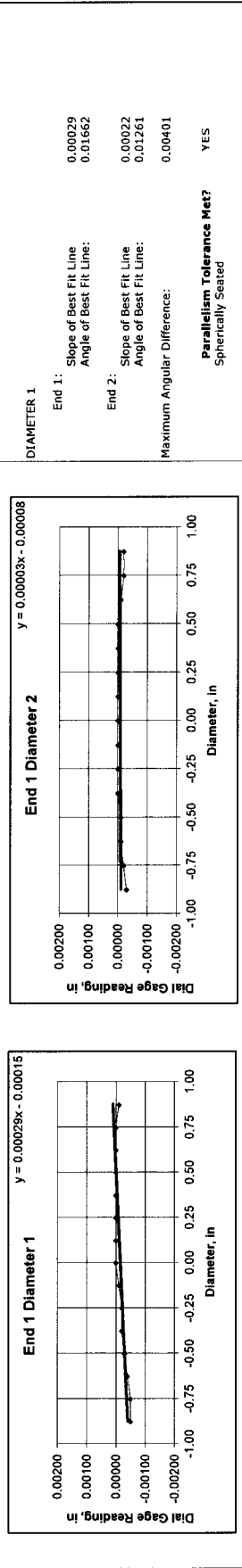
Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Boring ID: B-2
 Sample ID: C-3
 Depth: 110.16-110.53 ft
 Visual Description: See photographs

Test Date: 7/12/2013
 Tested By: daa
 Checked By: mpd

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY		Average	
Specimen Length, in:	4.39	4.39	4.39
Specimen Diameter, in:	1.98	1.99	1.99
Specimen Mass, g:	607.6		
Bulk Density, lb/ft ³ :	170		
Length to Diameter Ratio:	2.2		

END FLATNESS AND PARALLELISM (Procedure FP1)		Minimum Diameter Tolerance Met?		Length to Diameter Ratio Tolerance Met?		YES		YES	
END 1									
Diameter 1, in	-0.875	-0.750	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250
Diameter 2, in (rotated 90°)	-0.00050	-0.00050	-0.00030	-0.00020	-0.00020	-0.00010	0.00000	0.00000	0.00000
Diameter 1, in	-0.875	-0.750	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250
Diameter 2, in (rotated 90°)	-0.00050	-0.00060	-0.00030	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000



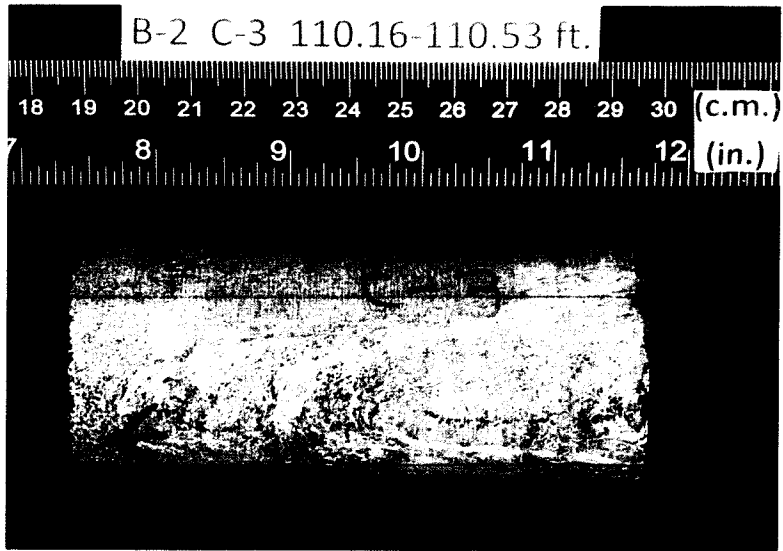
PERPENDICULARITY (Procedure P1)		Perpendicularity Tolerance Met?	
END 1			
Diameter 1, in	0.00050	0.014	YES
Diameter 2, in (rotated 90°)	0.00030	0.009	YES
END 2			
Diameter 1, in	0.00060	0.017	YES
Diameter 2, in (rotated 90°)	0.00010	0.003	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)		Maximum gap between side of core and reference surface plate: Is the maximum gap ≤ 0.02 in.?	
END 1			YES
Diameter 1, in	0.375	0.500	0.625
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000
Diameter 1, in	0.375	0.500	0.625
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000

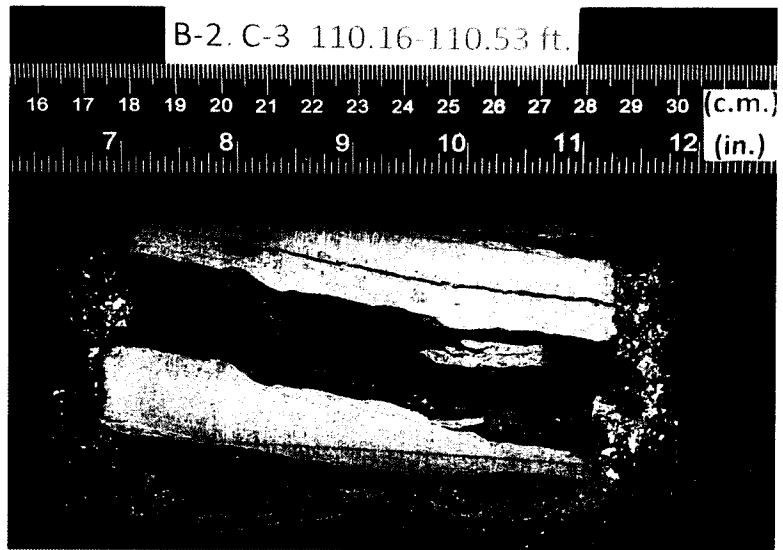
FLATNESS TOLERANCE MET?		PARALLELISM TOLERANCE MET?	
END 1			
Diameter 1, in	0.00029	0.00029	0.00003
Diameter 2, in (rotated 90°)	0.01662	0.01662	0.00172
END 2			
Diameter 1, in	0.00022	0.00022	0.00008
Diameter 2, in (rotated 90°)	0.01261	0.01261	0.00458



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	7/3/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-2
Sample ID:	C-3
Depth, ft:	110.16-110.53



After cutting and grinding



After break



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	07/03/13
Tested By:	daa
Checked By:	mpd

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D 7012 Method C**

Boring ID	Sample ID	Depth, ft	Bulk Density, $\frac{lb}{ft^3}$	Compressive Strength, psi	Failure Type	In conformance with ASTM D 4543
B-3	C-1	100.98-101.35	173	4,425	2	YES
B-3	C-2	109.27-109.64	170	3,918	2	NO*

- Notes:
- Density determined on core samples by measuring dimensions and weight and then calculating.
 - All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 - Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure (See attached photographs)
 - * The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored. Because the indicated tested specimens did not meet the standard tolerances for straightness the results reported here may differ from those for a test specimen within tolerances.



EXPRESS

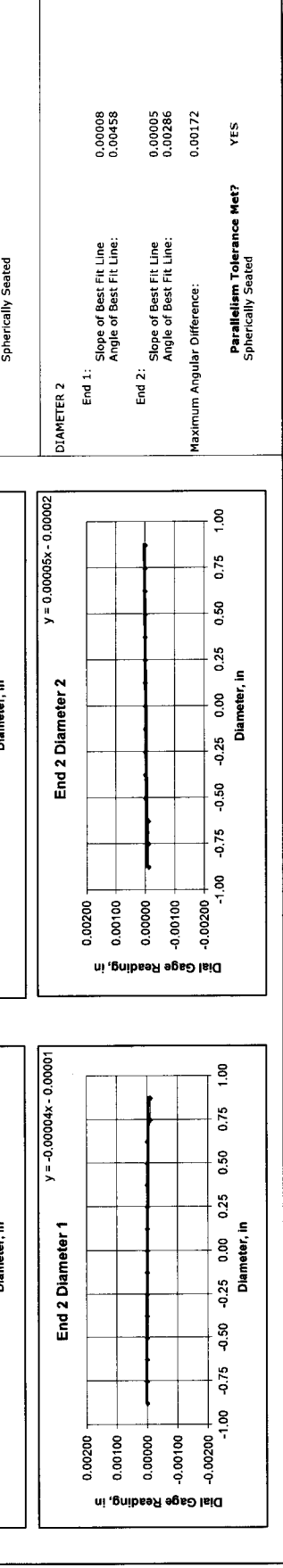
Client:	CDM Smith	Test Date:	7/12/2013
Project Name:	Demolition of District No. 1 Garage	Tested By:	daa
Project Location:	---	Checked By:	mpd
GTX #:	300666		
Boring ID:	B-3		
Sample ID:	C-1		
Depth:	100.98-101.35 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY			
Specimen Length, in:	2	Average	
4.30	4.30	4.30	
Specimen Diameter, in:	1.99	1.99	
Specimen Mass, g:	604.77		
Bulk Density, lb/ft ³ :	173		
Length to Diameter Ratio:	2.2		

END FLATNESS AND PARALLELISM (Procedure FP1)											
END	1	2	3	4	5	6	7	8	9	10	11
Diameter 1, in	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010
Diameter 1, in	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010
Diameter 1, in	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010

DEVIATION FROM STRAIGHTNESS (Procedure S1)											
END	1	2	3	4	5	6	7	8	9	10	11
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000



PERPENDICULARITY (Procedure P1)											
END	1	2	3	4	5	6	7	8	9	10	11
Diameter 1, in	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 1, in	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 1, in	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 1, in	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 1, in	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010

Maximum angle of departure must be $\leq 0.25^\circ$

Perpendicularity Tolerance Met? YES

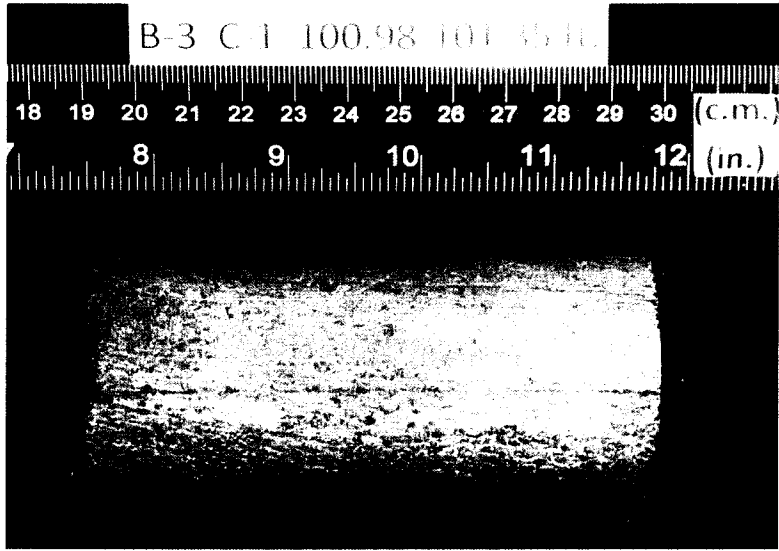
Perpendicularity Tolerance Met? YES

Parallelism Tolerance Met? Spherically Seated YES

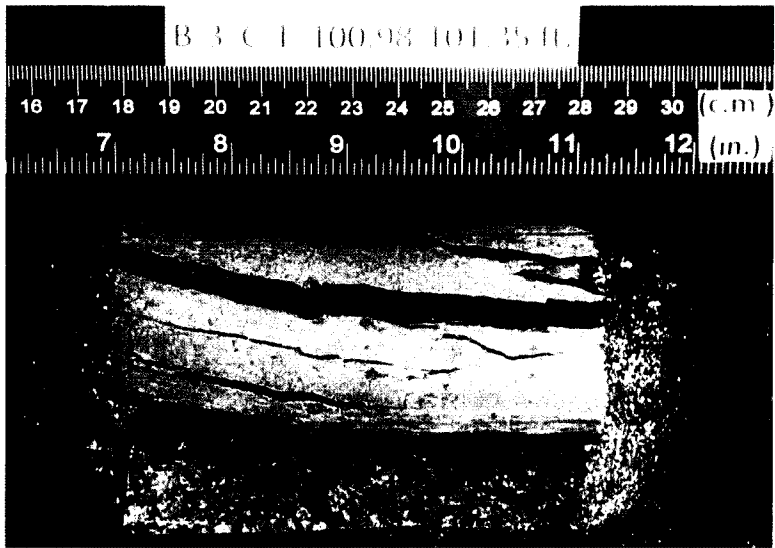
Parallelism Tolerance Met? Spherically Seated YES



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	7/3/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-3
Sample ID:	C-1
Depth, ft:	100.98-101.35



After cutting and grinding



After break



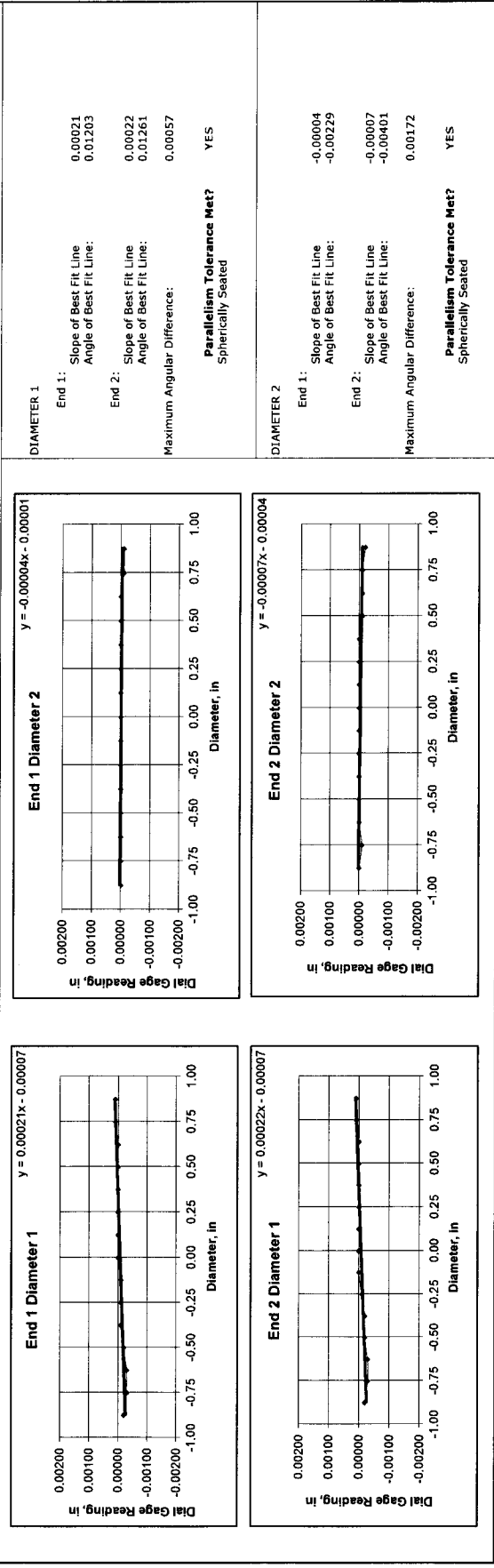
Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Boring ID: B-3
 Sample ID: C-2
 Depth: 109.27-109.64 ft
 Visual Description: See photographs

Test Date: 7/12/2013
 Tested By: daa
 Checked By: mpd

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY		DEVIATION FROM STRAIGHTNESS (Procedure S1)	
Specimen Length, in:	4.30	Average	4.30
Specimen Diameter, in:	1.98	Is the maximum gap between side of core and reference surface plate:	NO
Specimen Mass, g:	593.01	Is the maximum gap ≤ 0.02 in.?	NO
Bulk Density, lb/ft ³ :	170	Maximum difference must be < 0.020 in.	
Length to Diameter Ratio:	2.2	Straightness Tolerance Met?	NO

END FLATNESS AND PARALLELISM (Procedure FP1)		Length to Diameter Ratio Tolerance Met?	
END 1		YES	YES
Diameter 1, in	-0.875	-0.250	-0.125
Diameter 2, in (rotated 90°)	-0.00020	-0.00010	-0.00010
	0.00000	0.00000	0.00000
END 2		YES	YES
Diameter 1, in	-0.875	-0.250	-0.125
Diameter 2, in (rotated 90°)	-0.00030	-0.00010	-0.00010
	0.00000	0.00000	0.00000

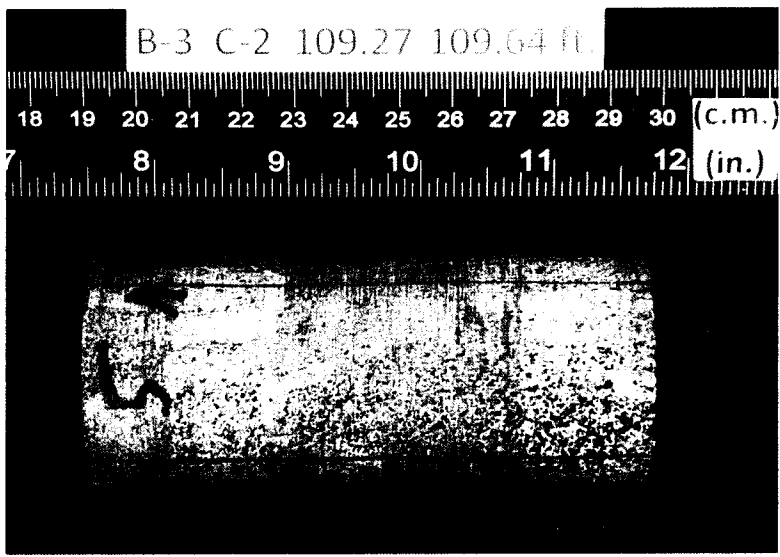


PERPENDICULARITY (Procedure P1)		Perpendicularity Tolerance Met?	
END 1		YES	YES
Diameter 1, in	0.00040	0.012	0.012
Diameter 2, in (rotated 90°)	0.00010	0.003	0.003
END 2		YES	YES
Diameter 1, in	0.00040	0.012	0.012
Diameter 2, in (rotated 90°)	0.00020	0.006	0.006

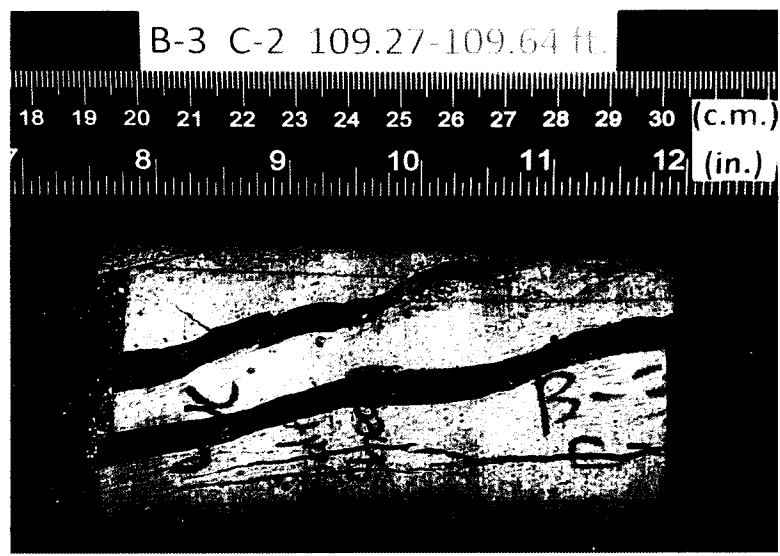
PARALLELISM TOLERANCE MET?		PERPENDICULARITY TOLERANCE MET?	
DIAMETER 1	YES	YES	YES
DIAMETER 2	YES	YES	YES



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	7/3/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-3
Sample ID:	C-2
Depth, ft:	109.27-109.64



After cutting and grinding



After break



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	06/28/13
Tested By:	daa
Checked By:	mpd

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D 7012 Method C**

Boring ID	Sample ID	Depth, ft	Bulk Density, lb/ft ³	Compressive Strength, psi	Failure Type	In conformance with ASTM D 4543
B-4	C-2	107.25-107.62	174	5,319	2	YES
B-4	C-4	115.90-116.27	172	1,440	2	YES

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.
 All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure (See attached photographs)



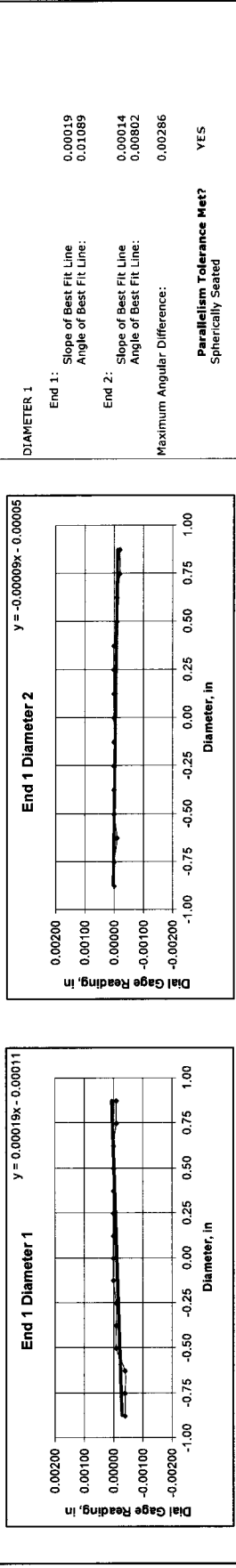
EXPRESS

Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: daa
 Test Date: 6/27/2013
 Tested By: mpd
 Checked By: mpd
 GTX #: 300666
 Boring ID: B-4
 Sample ID: C-2
 Depth: 107.25-107.62 ft
 Visual Description: See photographs

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY		Average	
Specimen Length, in:	4.33	4.33	4.33
Specimen Diameter, in:	1.98	1.99	1.99
Specimen Mass, g:	612.74		
Bulk Density, lb/ft ³ :	174		
Length to Diameter Ratio:	2.2		

END FLATNESS AND PARALLELISM (Procedure FP1)		Minimum Diameter Tolerance Met?		Length to Diameter Ratio Tolerance Met?		Straightness Tolerance Met?									
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00040	-0.00040	-0.00040	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010
Diameter 2, in (rotated 90°)	0.00000	0.00000	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00030	-0.00030	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010
Diameter 2, in (rotated 90°)	-0.00030	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00030	-0.00040



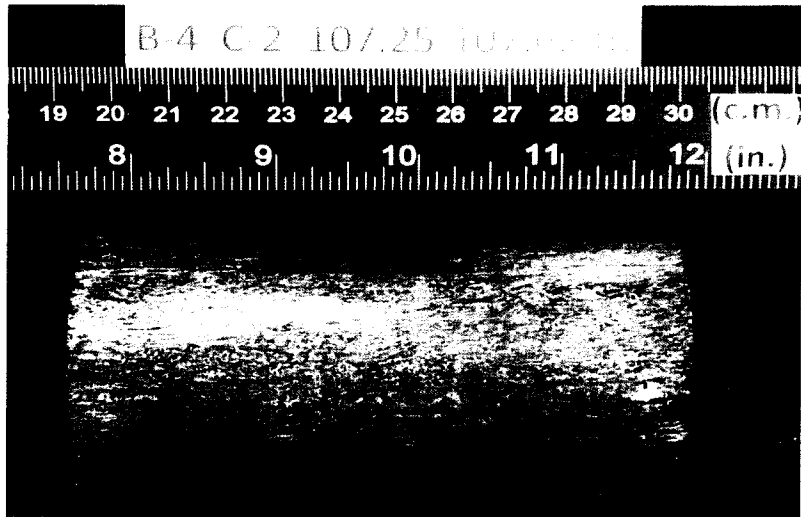
PERPENDICULARITY (Procedure P1)		Difference, Maximum and Minimum (in.)		Diameter (in.)		Slope		Angle°	
END 1	0.00040	0.00020	1.985	1.985	0.00020	0.012	0.006	0.009	0.012
Diameter 1, in	0.00020	0.00010	0.006	0.006	0.00010	0.006	0.006	0.009	0.012
Diameter 2, in (rotated 90°)	0.00020	0.00010	0.006	0.006	0.00010	0.006	0.006	0.009	0.012
END 2	0.00030	0.00040	1.985	1.985	0.00030	0.015	0.009	0.009	0.015
Diameter 1, in	0.00030	0.00040	1.985	1.985	0.00030	0.015	0.009	0.009	0.015
Diameter 2, in (rotated 90°)	0.00040	0.00020	1.985	1.985	0.00020	0.012	0.012	0.012	0.012

DEVIATION FROM STRAIGHTNESS (Procedure S1)		Maximum gap between side of core and reference surface plate:	
Is the maximum gap ≤ 0.02 in.?	YES	Maximum difference must be < 0.020 in.	YES
90° =	0.00040	90° =	0.00020

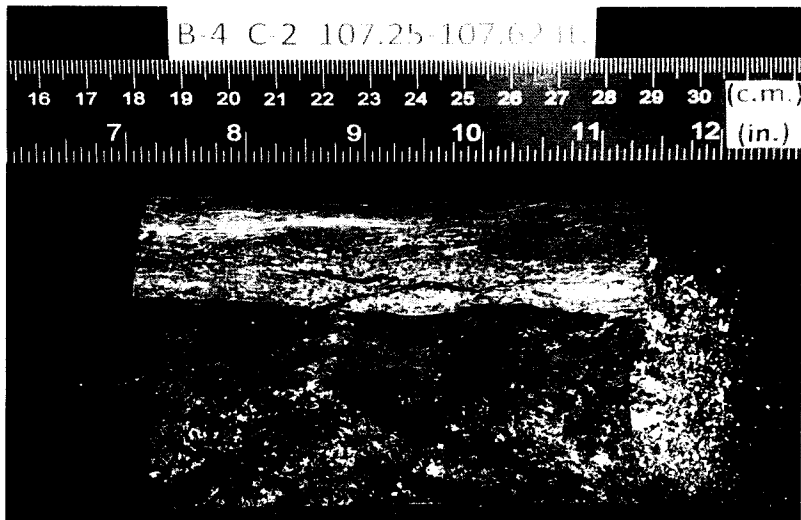
PERPENDICULARITY TOLERANCE MET?		PARALLELISM TOLERANCE MET?	
End 1: Slope of Best Fit Line	0.00019	End 1: Slope of Best Fit Line	-0.00009
End 1: Angle of Best Fit Line	0.01089	End 1: Angle of Best Fit Line	-0.00516
End 2: Slope of Best Fit Line	0.00014	End 2: Slope of Best Fit Line	-0.00005
End 2: Angle of Best Fit Line	0.00802	End 2: Angle of Best Fit Line	-0.00286
Maximum Angular Difference:	0.00286	Maximum Angular Difference:	0.00229
Parallelism Tolerance Met? Spherically Seated	YES	Parallelism Tolerance Met? Spherically Seated	YES



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	6/28/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-4
Sample ID:	C-2
Depth, ft:	107.25-107.62



After cutting and grinding



After break



E X P R E S S

Client: CDH Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Boring ID: B-4
 Sample ID: C-4
 Depth: 115.90-116.27 ft
 Visual Description: See photographs

Test Date: 6/27/2013
 Tested By: daa
 Checked By: mpd

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

BULK DENSITY

Specimen Length, in:	4.33	4.34	Average	4.34
Specimen Diameter, in:	1.98	1.99		1.99
Specimen Mass, g:	606.59			
Bulk Density, lb/ft ³	172			
Length to Diameter Ratio:	2.2			

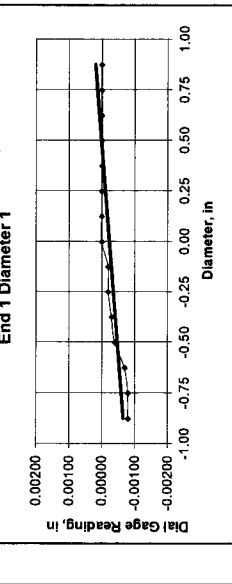
END FLATNESS AND PARALLELISM (Procedure Fp1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00080	-0.00070	-0.00060	-0.00050	-0.00040	-0.00030	-0.00020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00080	-0.00070	-0.00050	-0.00040	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

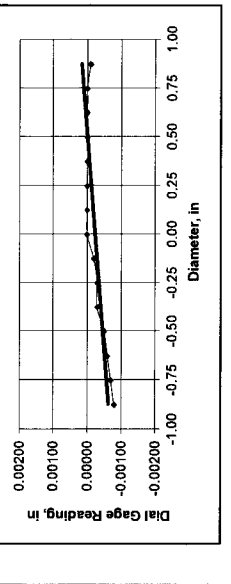
END 2

Diameter 1, in	-0.00080	-0.00070	-0.00060	-0.00050	-0.00040	-0.00030	-0.00020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00050	-0.00040	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00010	0.00020	0.00030	0.00040	0.00050	0.00060

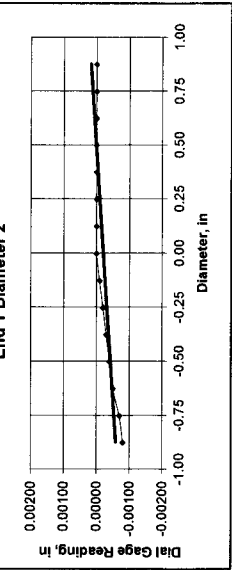
END 1 Diameter 1



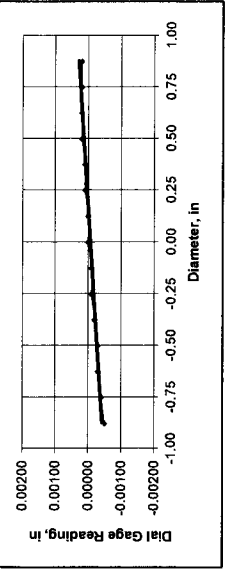
END 2 Diameter 1



END 1 Diameter 2



END 2 Diameter 2



DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate: Is the maximum gap ≤ 0.02 in.?	YES
Maximum difference must be < 0.020 in.	YES
Flatness Tolerance Met?	YES
Parallelism Tolerance Met?	YES
Perpendicularity Tolerance Met?	YES

DIAMETER 1

End 1:
Slope of Best Fit Line: 0.00049
Angle of Best Fit Line: 0.02807

End 2:
Slope of Best Fit Line: 0.00045
Angle of Best Fit Line: 0.02578

Maximum Angular Difference: 0.00229

Parallelism Tolerance Met?
Spherically Seated: YES

DIAMETER 2

End 1:
Slope of Best Fit Line: 0.00044
Angle of Best Fit Line: 0.02521

End 2:
Slope of Best Fit Line: 0.00041
Angle of Best Fit Line: 0.02349

Maximum Angular Difference: 0.00172

Parallelism Tolerance Met?
Spherically Seated: YES

PERPENDICULARITY (Procedure P1)

END 1	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080	0.00080
Diameter 1, in	0.00080	0.00070	0.00060	0.00050	0.00040	0.00030	0.00020	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00080	0.00070	0.00060	0.00050	0.00040	0.00030	0.00020	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

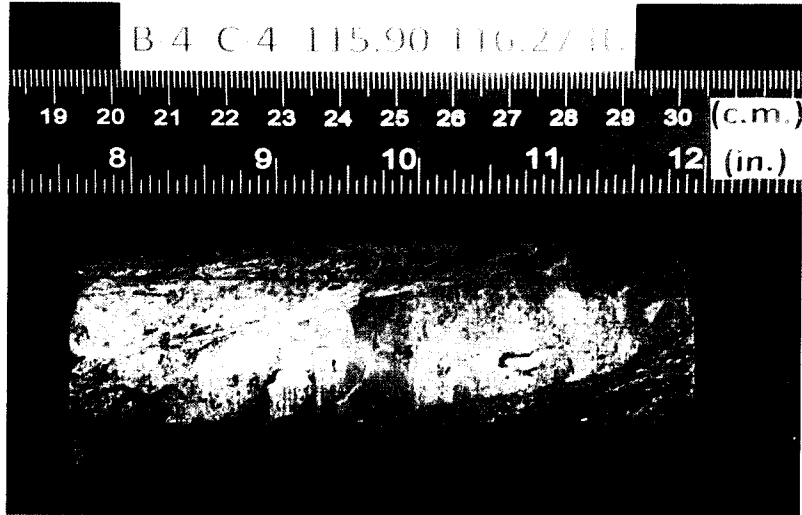
Maximum angle of departure must be $\leq 0.25^\circ$

Perpendicularity Tolerance Met?

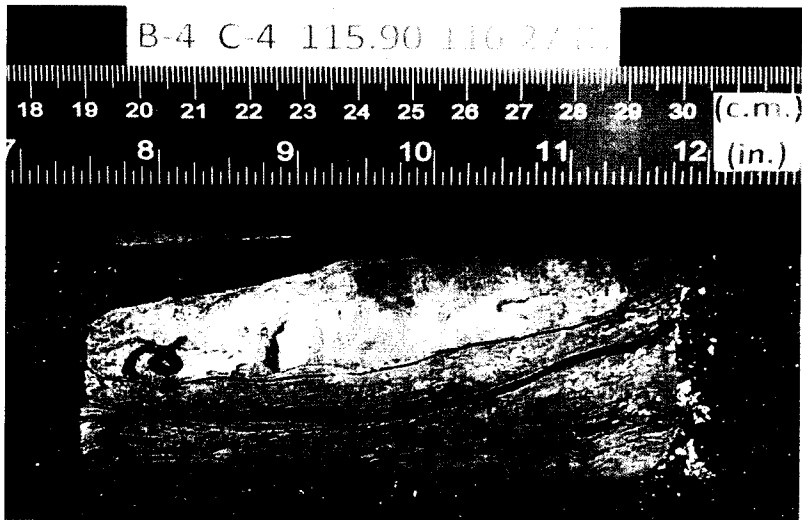
YES



Client:	CDM Smith
Project Name:	Demolition of District No. 1 Garage
Project Location:	---
GTX #:	300666
Test Date:	6/28/2013
Tested By:	daa
Checked By:	mpd
Boring ID:	B-4
Sample ID:	C-4
Depth, ft:	115.90-116.27



After cutting and grinding



After break

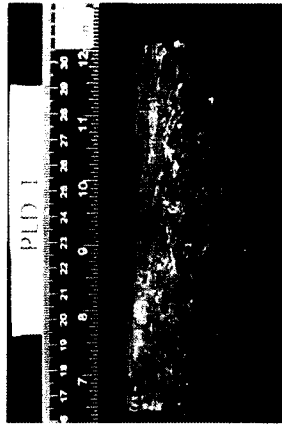
Client: CDM Smith
 Project Name: Demolition of District No.1 Garage
 Project Location: ---
 GTX #: 300666

Test Date: 07/01/13
 Tested By: cnk
 Checked By: mpd
 Sample Type: rock core

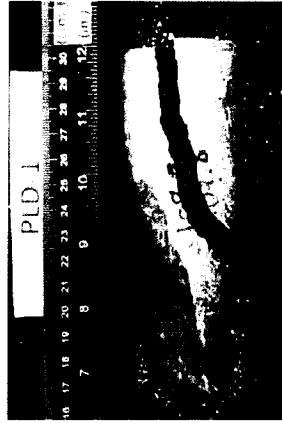
Point Load Strength Index of Rock by ASTM D 5731

Boring No.	Sample No.	Depth, ft.	Test No.	Test Type	Specimen Diameter (D), in.	Specimen Length (L), in.	Failure Load (P), lbs.	D_e^2 , in ²	D_{er} , in.	I_{sr} , psi	F	$I_{s(50mm)}$, psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
B-2	C-3	109.8-111.0	PLD-1	Diametral	1.98	4.54	1884	3.93	1.98	479	1.003	481	23	11,000

PLD-1
before



PLD-1
after



Discontinuity Failure

Notes:

- Generalized correction factor, K, used to estimate the compressive strength based on the specimen diameter and ASTM D 5731 Table 1.
- D_e = the equivalent core diameter
- I_s = the uncorrected point load strength index
- F = the size correction factor
- $I_{s(50)}$ = the size corrected point load strength index

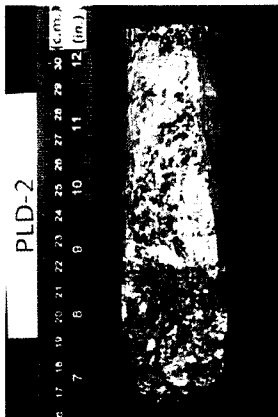
Client: CDM Smith
 Project Name: Demolition of District No.1 Garage
 Project Location: ---
 GTX #: 300666

Test Date: 07/01/13
 Tested By: cnk
 Checked By: mpd
 Sample Type: rock core

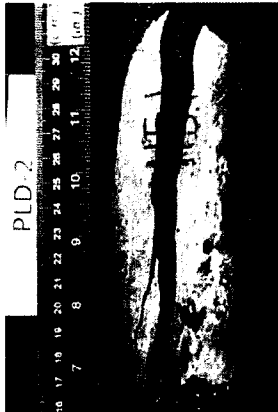
Point Load Strength Index of Rock by ASTM D 5731

Boring No.	Sample No.	Depth, ft.	Test No.	Test Type	Specimen Diameter (D), in.	Specimen Length (L), in.	Failure Load (P), lbs.	D _e ² , in ²	D _e , in.	I _s , psi	F	I _{s(50)} , psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
B-3	C-3	114.0-115.0	PLD-2	Diametral	1.98	5.16	414	3.94	1.98	105	1.004	105	23	2,410

PLD - 2
before



PLD - 2
after



Discontinuity Failure

Notes:

Generalized correction factor, K, used to estimate the compressive strength based on the specimen diameter and ASTM D 5731 Table 1.

D_e = the equivalent core diameter

I_s = the uncorrected point load strength index

F = the size correction factor

I_{s(50)} = the size corrected point load strength index

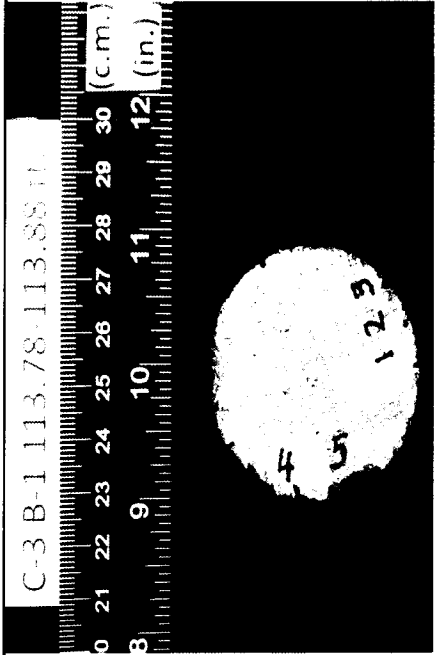
Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Test Date: 06/25/13
 Tested By: mfk
 Checked By: mpd

Abrasiveness of Rock Using the CERCHAR Method by ASTM D 7625

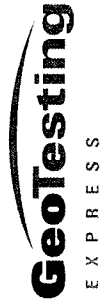
Boring ID	Sample ID	Depth, ft.	Stylus No.	Reading 1	Reading 2	Average	Comments
B-1	C-3	113.78-113.88	1	3.5	3.8	3.65	
			2	4.2	4.0	4.10	
			3	3.2	3.4	3.30	
			4	5.7	5.5	5.60	
			5	4.5	4.6	4.55	
			Average CAIs		4.24		
			Average CAI *		4.68		
CERCHAR Abrasiveness Index Classification Extreme Abrasiveness							

Notes:

Test Surface: Saw Cut
 Moisture Condition: As Received
 Apparatus Type: Original CERCHAR
 Stylus Hardness: Rockwell Hardness 54/56 HRC
 Stylus Displacement Relative to Rock Fabric:
 Styli 1-3: Normal; Styli 4-5: Parallel
 * CAI = $(0.99 \times CAI_s) + 0.48$
 CAIs = CERCHAR index for smooth (saw cut) surface
 CAI = CERCHAR index for natural surface



After Test



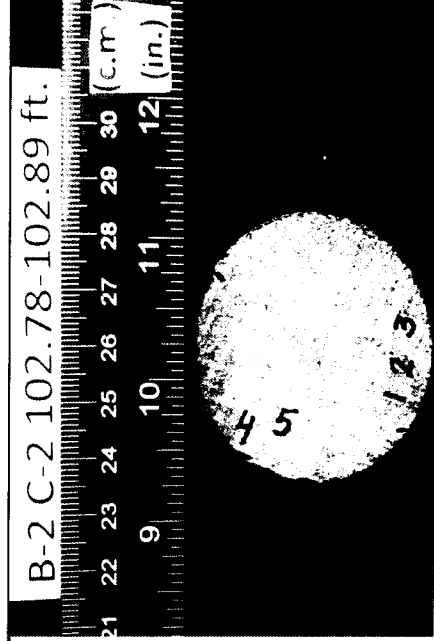
Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Test Date: 06/28/13
 Tested By: mfk
 Checked By: mpd

Abrasiveness of Rock Using the CERCHAR Method by ASTM D 7625

Boring ID	Sample ID	Depth, ft.	Stylus No.	Reading 1	Reading 2	Average	Comments
B-2	C-2	102.78-102.89	1	4.2	5.5	4.85	
			2	4.7	4.0	4.35	
			3	3.5	3.3	3.40	
			4	4.9	4.9	4.90	
			5	3.4	3.4	3.40	
			Average CAIs		4.18		
			Average CAI *		4.62		
CERCHAR Abrasiveness Index Classification Extreme Abrasiveness							

Notes:

Test Surface: Saw Cut
 Moisture Condition: As Received
 Apparatus Type: Original CERCHAR
 Stylus Hardness: Rockwell Hardness 54/56 HRC
 Stylus Displacement Relative to Rock Fabric:
 Styli 1-3: Normal; Styli 4-5: Parallel
 * CAI = $(0.99 \times CAI_s) + 0.48$
 CAIs = CERCHAR index for smooth (saw cut) surface
 CAI = CERCHAR index for natural surface



After Test

Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Test Date: 06/28/13
 Tested By: mfk
 Checked By: mpd

Abrasiveness of Rock Using the CERCHAR Method by ASTM D 7625

Boring ID	Sample ID	Depth, ft.	Stylus No.	Reading 1	Reading 2	Average	Comments
B-3	C-2	109.15-109.26	1	4.1	4.2	4.15	
			2	3.9	4.0	3.95	
			3	5.5	4.6	5.05	
			4	3.5	3.9	3.70	
			5	4.2	4.0	4.10	
			Average CAIs		4.19		
			Average CAI *		4.63		

CERCHAR Abrasiveness Index Classification Extreme Abrasiveness

Notes:

Test Surface: Saw Cut
 Moisture Condition: As Received
 Apparatus Type: Original CERCHAR
 Stylus Hardness: Rockwell Hardness 54/56 HRC
 Stylus Displacement Relative to Rock Fabric:
 Styli 1-3: Normal; Styli 4-5: Parallel
 * CAI = (0.99 x CAI_s) + 0.48
 CAI_s = CERCHAR index for smooth (saw cut) surface
 CAI = CERCHAR index for natural surface



After Test



Client: CDM Smith
 Project Name: Demolition of District No. 1 Garage
 Project Location: ---
 GTX #: 300666
 Test Date: 06/25/13
 Tested By: mfk
 Checked By: mpd

Abrasive of Rock Using the CERCHAR Method by ASTM D 7625

Boring ID	Sample ID	Depth, ft.	Stylus No.	Reading 1	Reading 2	Average	Comments
B-4	C-2	106.64-106.74	1	3.2	2.5	2.85	
			2	3.5	2.8	3.15	
			3	3.2	3.5	3.35	
			4	2.5	2.8	2.65	
			5	3.6	3.8	3.70	
			Average CAIs		3.14		
			Average CAI *		3.59		
CERCHAR Abrasiveness Index Classification							High Abrasiveness

Notes:

Test Surface: Saw Cut
 Moisture Condition: As Received
 Apparatus Type: Original CERCHAR
 Stylus Hardness: Rockwell Hardness 54/56 HRC
 Stylus Displacement Relative to Rock Fabric:
 Styli 1-3: Normal; Styli 4-5: Parallel
 * CAI = $(0.99 \times CAI_s) + 0.48$
 CAIs = CERCHAR index for smooth (saw cut) surface
 CAI = CERCHAR index for natural surface

After Test

APPENDIX E
Project Calculations

AXIAL CAPACITY CALCULATION

CLIENT: NYCCDC
 PROJECT: Spring Street Salt Shed
 DETAIL: Micro-caisson capacity evaluation

TASK: 41
 DATE CHK: 6/24/2013
 CHECK BY: JAG

COMP BY: MPS
 DATE: 6/17/2013
 PAGE: 1 of 1
 REV DATE: 7/5/2013
 REV: 2

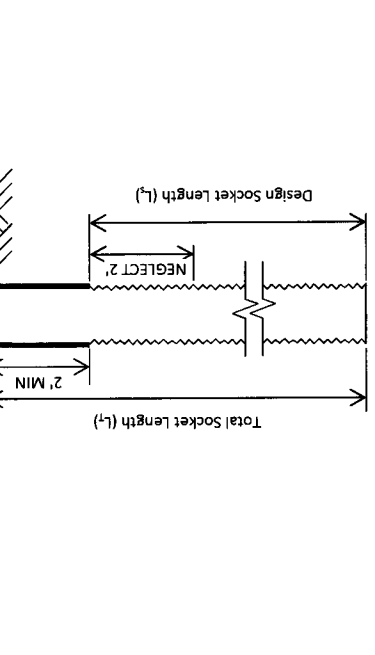
Purpose: To evaluate the socket length for proposed micro-caissons to support salt shed.
Problem: Per drawing S-101.00, Caisson Plan dated April 22, 2013, require micro-caisson with allowable capacity of 200 tons and 300 tons.

Reference: 2. New York City Building Code, July 2008.

Assumptions:
 1. Casing is seated a minimum of 2 feet into rock.
 2. Ignore resistance from top 2 feet of rock socket below the bottom of the casing.
 3. Rock type is Class 1c or better.

Method/Approach:
Structural Capacity (Section 18.10.7.5)
Cased Section
 $P_{cased} = 0.33 \times f'_c \times A_g + 0.35 \times F_{yp} \times A_1 + 0.5 \times F_{yp} \times A_r$
 Ar shall not exceed 30% of Ag
 Minimum clearance between structural core and casing I.D. is 2", and for rock socket is 1.5"
 Minimum grout/concrete strength of 4000 psi.
Uncased Section
 $P_{uncased} = 0.33 \times f'_c \times A_{1s} + 0.5 \times F_{yp} \times A_r$
 where
 f'_c = grout/concrete strength
 A_g = Area Grout
 F_{yp} = Yield strength of pipe
 A_1 = area of pipe considering corrosion and joints.
 F_{yr} = yield strength of structural core
 A_{1s} = Area of structural core
 A_{1s} = Area of rock socket

Geotechnical Capacity
 $L_1 = P_{allowable} / (f_s \times 3.14 \times \phi_{socket}) + 2$
 where:
 $P_{allowable}$ = Allowable Compression Load
 f_s = Allowable Bond Strength
 L_1 = Design Socket length
 ϕ_{socket} = diameter of socket
 $L_1 = L_2 + 2$



Calculation:

Allowable Bond Strength	150
f'_c (psi)	4000
F_{yp} (psi)	30000
F_{yr} (psi)	75000

Socket ϕ (in)	Casing Outside Diameter (in)	Wall Thickness (in)	A1* (sq. in.)	Bar #	Bar Area (sq. in.)	Bar Quantity	Steel Core Area (sq. in.)	% Area Cased	% Area Socket	Structural Capacity		Geotechnical Capacity	
										Peaced (tons)	Purchased (tons)	Compression Capacity (tons)	Tension Capacity (tons)
8	9.625	0.545	8.18	11	1.56	3	4.68	6.4%	9.3%	168	126	88	63
8	9.625	0.545	8.18	20	4.91	1	4.91	6.7%	13.0%	173	130	92	65
8	9.625	0.545	8.18	24	7.07	1	7.07	9.7%	14.1%	213	170	133	85
8	9.625	0.545	8.18	28	9.61	1	9.61	13.2%	19.1%	261	218	180	109
12	13.75	0.48	9.41	20	4.91	1	4.91	3.3%	4.3%	226	177	92	88
12	13.75	0.48	9.41	14	2.25	3	6.75	4.5%	6.0%	284	235	117	106
12	13.75	0.48	9.41	18	4	2	8	5.4%	7.1%	318	269	184	134
12	13.75	0.48	9.41	20	4.91	2	9.82	6.6%	8.7%	359	310	225	155
12	13.75	0.48	9.41	18	4	3	12	8.1%	10.6%	305	234	84	84
16	18	0.50	13.55	14	2.25	2	4.5	1.8%	2.2%	371	300	150	150
16	18	0.50	13.55	18	4	2	8	3.1%	4.0%	486	415	265	207
16	18	0.50	13.55	24	7.07	2	14.14	5.6%	7.0%	581	510	360	255
16	18	0.50	13.55	28	9.61	2	19.22	7.6%	9.6%				

*Assumes casing area is reduced for 0.25 inch corrosion.

NOTES:
 1. Structural capacity of the micro-caisson has been evaluated for preliminary purposes only. Structural capacity in the cased and uncased segments shall be confirmed by the structural engineer of record.

COMP BY: MPS
 DATE: 6/17/2013
 PAGE: 1 of 1
 REV DATE: 7/5/2013
 REV: 2

TASK: 5041
 DATE CHK: 6/24/2013
 CHECK BY: JAG

CLIENT: NYCDDC
 PROJECT: Spring Street Salt Shed
 DETAIL: Micro-caisson capacity evaluation

Purpose: To evaluate the socket length for proposed micro-caissons to support salt shed.

Problem: Per drawing S-101.00, Caisson Plan dated April 22, 2013, require micro-caisson with allowable capacity of 200 tons and 300 tons.

Reference: 2. New York City Building Code, July 2008.

- Assumptions:
- Casing is seated a minimum of 2 feet into rock.
 - Ignore resistance from top 2 feet of rock socket below the bottom of the casing.
 - Rock type is Class 1c or better.

Method/Approach: Structural Capacity (Section 1810.7.5)

Cased Section

$$P_{cased} = 0.33 \times f_c \times A_k + 0.35 \times F_{yp} \times A_j + 0.5 \times F_w \times A_s$$

Ar shall not exceed 30% of A

Minimum clearance between structural core and casing I.D. is 2" and for rock socket is 1.5"

Minimum grout/concrete strength of 4000 psi.

Uncased Section

$$P_{uncased} = 0.33 \times f_c \times A_k + 0.5 \times F_w \times A_s$$

where

f_c = grout/concrete strength

A_k = Area Grout

F_{yp} = yield strength of pipe

A_j = area of pipe considering corrosion and joints.

F_w = Yield strength of structural core

A_s = Area of structural core

A_c = Area of rock socket

Geotechnical Capacity

$$L_1 = P_{allowable} / (f_r \times 3.14 \times \phi_{socket}) + 2$$

where:

$P_{allowable}$ = Allowable Compression Load

f_r = Allowable Bond Strength

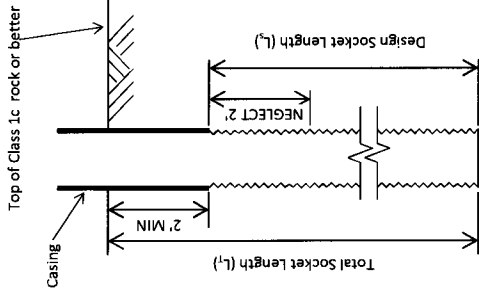
L_1 = Design Socket length

ϕ_{socket} = diameter of socket

$L_1 = L_2 + 2$

where:

L_1 = Total Socket Length



Calculation:

Allowable Bond Strength	200
f_r (psi)	4000
F_{yp} (psi)	30000
F_w (psi)	75000

Socket ϕ (in)	Casing Outside Diameter (in)	Wall Thickness (in)	Al* (sq. in.)	Bar #	Bar Area (sq. in.)	Bar Quantity	Steel Core Area (sq. in.)	% Area Cased	% Area Socket	Structural Capacity		Geotechnical Capacity	
										Compression	Tension	Compression Capacity (tons)	Tension Capacity (tons)
8	9.625	0.545	8.18	11	1.56	3	4.68	6.4%	9.3%	168	88	126	63
8	9.625	0.545	8.18	20	4.91	1	4.91	6.7%	9.8%	173	92	130	65
8	9.625	0.545	8.18	24	7.07	1	7.07	9.7%	14.1%	213	133	170	85
8	9.625	0.545	8.18	28	9.61	1	9.61	13.2%	19.1%	261	180	218	109
12	13.75	0.48	9.41	20	4.91	1	4.91	3.3%	4.3%	226	92	177	88
12	13.75	0.48	9.41	14	2.25	3	6.75	4.5%	6.0%	261	117	211	106
12	13.75	0.48	9.41	18	4	2	8	5.4%	7.1%	284	150	235	117
12	13.75	0.48	9.41	20	4.91	2	9.82	6.6%	8.7%	318	184	269	134
12	13.75	0.48	9.41	18	4	3	12	8.1%	10.6%	359	225	310	155
16	18	0.50	13.55	14	2.25	2	4.5	1.8%	2.2%	305	84	234	84
16	18	0.50	13.55	18	4	2	8	3.1%	4.0%	371	150	300	150
16	18	0.50	13.55	24	7.07	2	14.14	5.6%	7.0%	486	365	415	207
16	18	0.50	13.55	28	9.61	2	19.22	7.6%	9.6%	581	510	510	255

*Assumes casing area is reduced for 0.25 inch corrosion.

NOTES:

- Structural capacity of the micro-caisson has been evaluated for preliminary sizes purposes only. Structural capacity in the cased and uncased segments shall be confirmed by the structural engineer of record.

LATERAL CAPACITY CALCULATION

Client: NYCDDC
Project: Spring Street Salt Shed
Detail: Micro-caisson capacity evaluation

Checked by: JAG
Date: 6/24/2013

Task 9401
Computed by: MPS
Date: 6/17/2013

Purpose

Evaluate the lateral capacity of micro-caisson to support salt shed using data from boring logs.

Assumptions

1. Assume vertical micro-caissons with 13.375" x 0.5" casing.
2. Assume micro-caisson behave in free head condition.
3. Assume casing loses 0.25" of wall thickness due to corrosion.

Method

1. Calculations performed in general accordance FHWA.
2. Calculations performed using CivilTech software package ALL-PILE Version 7.12v
3. Calculations performed using NAVFAC procedure.

References

1. Axial design loads provided by NYCDDC.

Results

See appended.

Client: NYCDDC
 Project: Spring Street Salt Shed
 Detail: Micro-caisson capacity evaluation

Checked by: JAG
 Date: 6/24/2013

Task 9401
 Computed by: MPS
 Date: 6/17/2013

Summary of Analysis Inputs

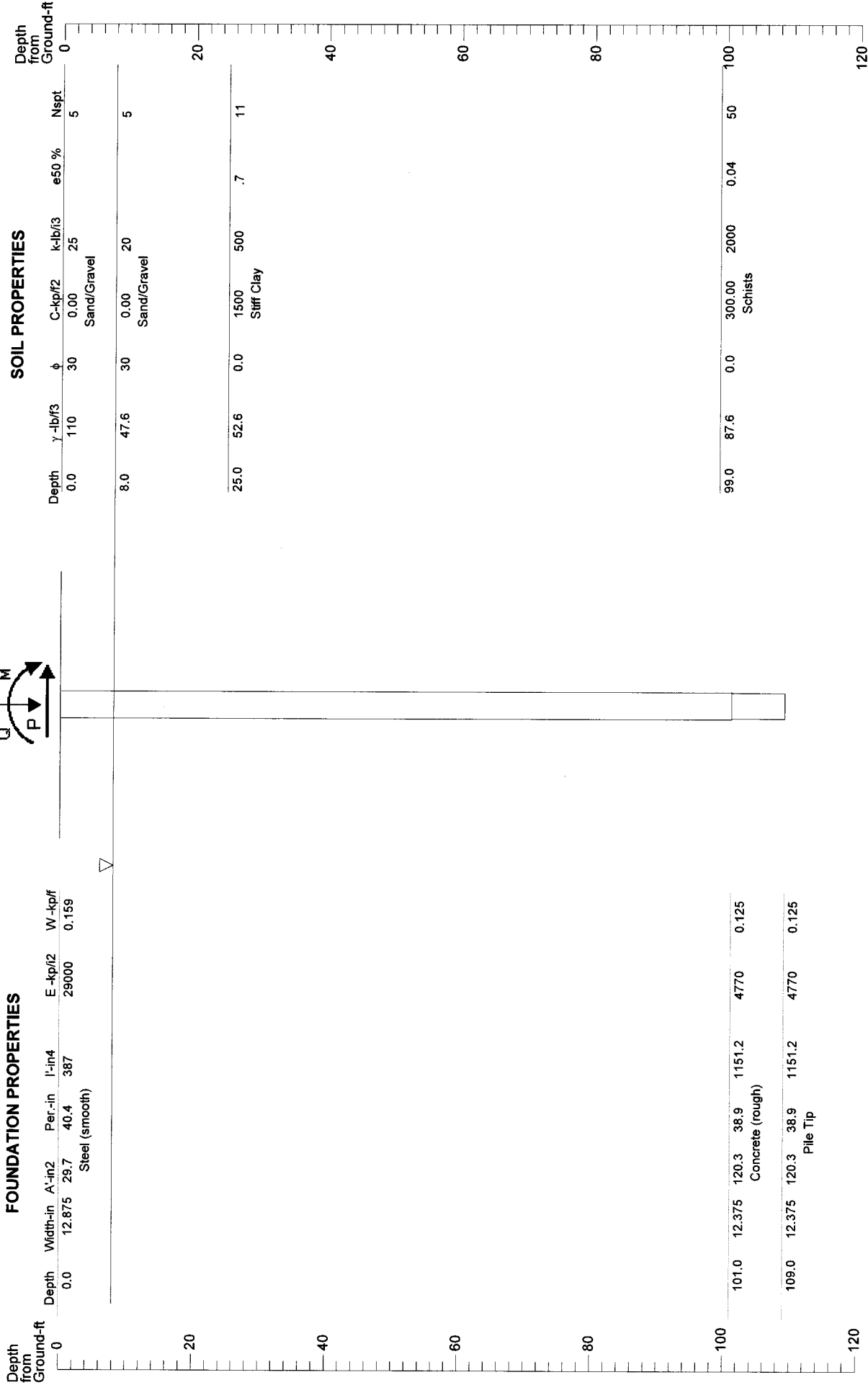
Design Test Boring Profile	Design Loads		Casing Data		Casing Considering Corrosion			F'c Grout (psi)	E Grout (ksi)	E Steel (ksi)	Pile Head Condition	Analyzed pile Termination Condition
	Vertical Load per pile (tons)	Vertical Load per pile (kips)	Casing Outside Diameter (in)	Casing Wall Thickness (in)	Casing Outside Diameter (in)	Casing Wall Thickness (in)						
B-1, B-2	200	400.0	13.375	0.5	13.125	0.25	4000	3600	29000	Free Head	8 ft rock socket below bottom of casing	
B-1, B-2	300	600.0	13.375	0.5	13.125	0.25	4000	3600	29000	Free Head	11 ft rock socket below bottom of casing	

Summary of Results

Design Test Boring Profile	Design Loads		AllPile Results			NAVFAC Results		Recommended Allowable Load (ton)
	Vertical Load per pile (tons)	Vertical Load per pile (Kips)	Load at 1" Deflection (kip)	Load at 1" Deflection (ton)	Load at 1" Deflection (ton)	Allowable Load (ton)	Allowable Load (ton)	
B-1, B-2	200	400.0	18.3	9.2	6.3	3.2	5.0	
B-1, B-2	300	600.0	16.5	8.3	6.3	3.2	5.0	

FOUNDATION PROFILE & SOIL CONDITIONS

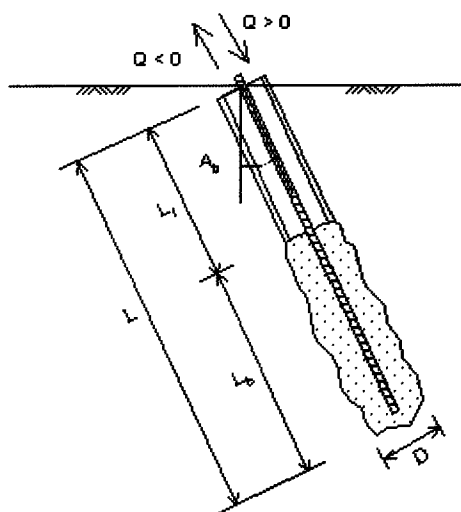
For uplift and compression, one no-friction steel casing section and one high pressure grouted section.



Batter Angle=0 (Pile diameter not to scale) Surface Angle=0

200 ton Micro-caisson Salt Shed - Borough of Manhattan, NY

LATERAL ANALYSIS



Micropile (MiniPile)

Loads:

Load Factor for Vertical Loads= 1.0
 Load Factor for Lateral Loads= 1.0
 Loads Supported by Pile Cap= 0 %
 Shear Condition: Static

(with Load Factor)

Vertical Load, Q= 400.0 -kp
 Shear Load, P= 18.3 -kp
 Moment, M= 0.0 -kp-f

Profile:

Pile Length, L= 109.0 -ft
 Top Height, H= 0 -ft
 Slope Angle, As= 0
 Batter Angle, Ab= 0

* Zero Tip Resistance *

The tip resistance is zero

* Zero Friction *

Zero Friction Start: 0 -ft End: 103 -ft

Soil Data:

Depth -ft	Gamma -lb/f3	Phi	C -kp/f2	K -lb/i3	e50 or Dr %	Nspt
0	110	30	0.00	25		5
8	47.6	30	0.00	20		5
25	52.6	0.0	1500	500	.7	11
99	87.6	0.0	300.00	2000	0.04	50

Pile Data:

Depth -ft	Width -in	Area -in2	Per. -in	I -in4	E -kp/i2	Weight -kp/f
0.0	12.875	29.7	40.4	387	29000	0.159
101.0	12.375	120.3	38.9	1151.2	4770	0.125
109.0	12.375	120.3	38.9	1151.2	4770	0.125

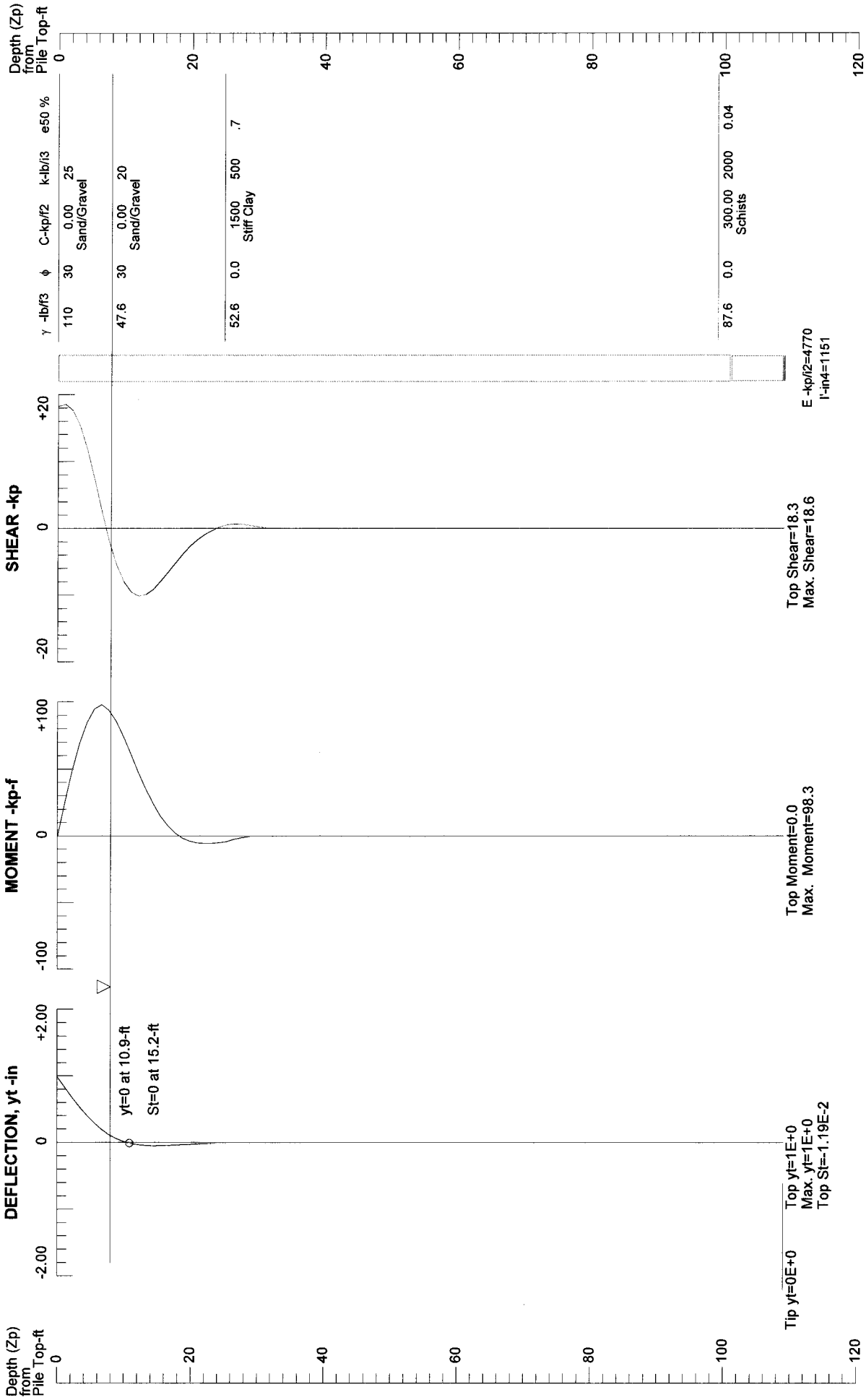
Single Pile Lateral Analysis:

Top Deflection, yt= 1.00000-in
 Max. Moment, M= 98.33-kp-f
 Top Deflection Slope, St= -0.01190
 N/G! Top Deflection, 1.0000-in, Exceeds the Allowable Deflection= 1.00-in

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.
 The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.

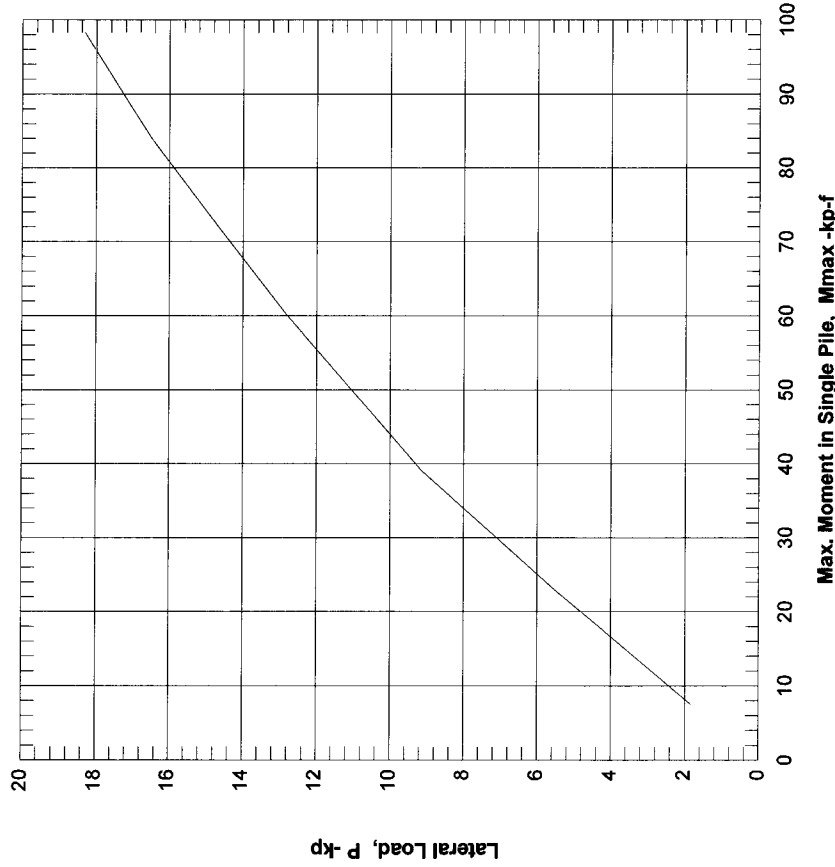
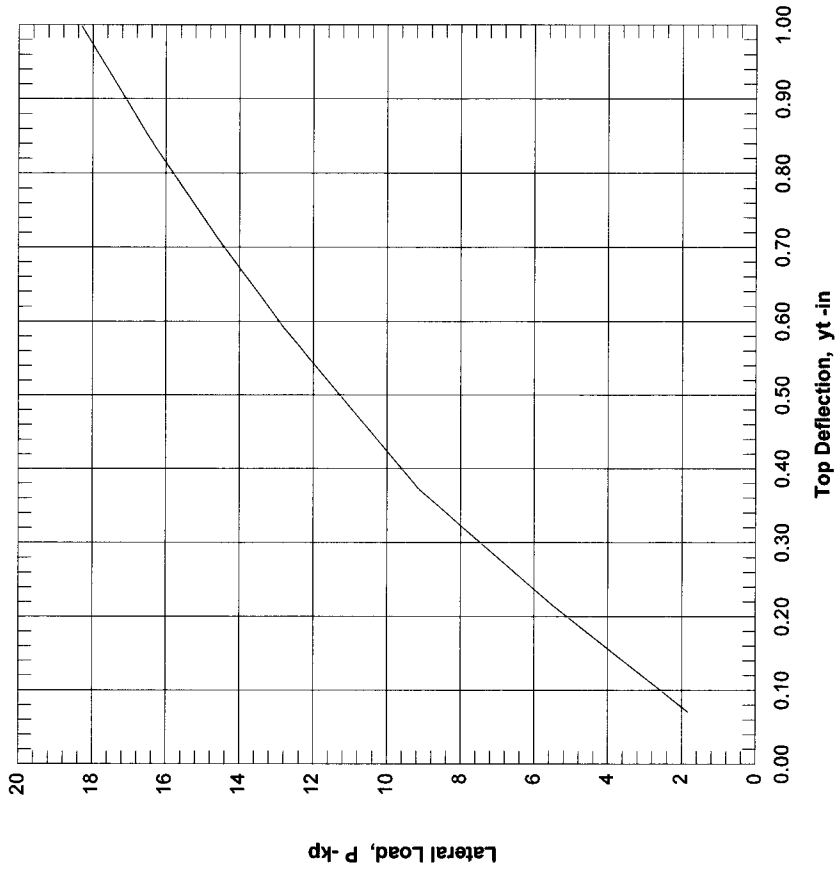
PILE DEFLECTION & FORCE VS DEPTH

Single Pile, Khead=1, Kbc=1

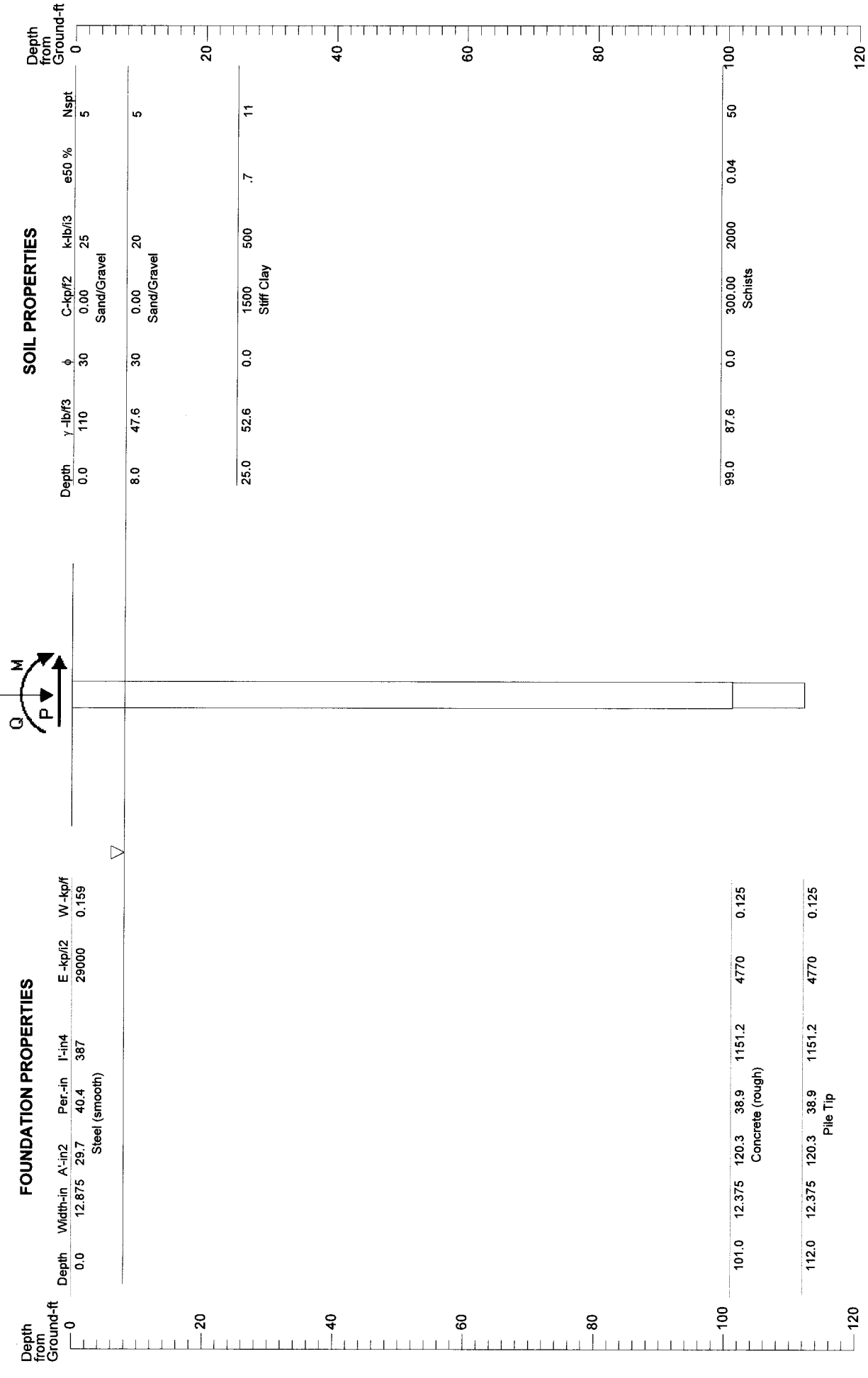




LATERAL LOAD vs DEFLECTION & MAX. MOMENT



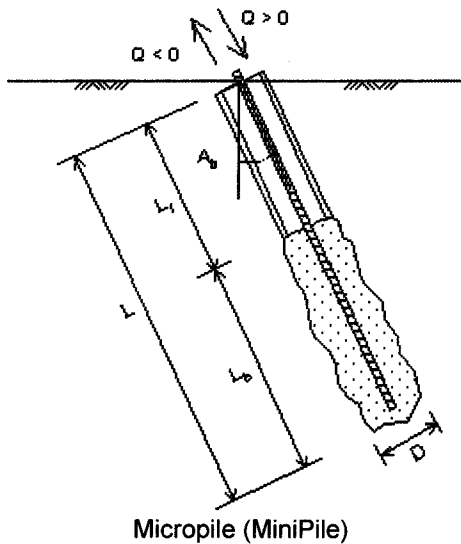
FOUNDATION PROFILE & SOIL CONDITIONS



Batter Angle=0 (Pile diameter not to scale) Surface Angle=0

300 ton Micro-caisson
Salt Shed - Borough of Manhattan, NY

LATERAL ANALYSIS



Loads:

Load Factor for Vertical Loads= 1.0
 Load Factor for Lateral Loads= 1.0
 Loads Supported by Pile Cap= 0 %
 Shear Condition: Static

(with Load Factor)

Vertical Load, Q= 600.0 -kp
 Shear Load, P= 16.5 -kp
 Moment, M= 0.0 -kp-f

Profile:

Pile Length, L= 112.0 -ft
 Top Height, H= 0 -ft
 Slope Angle, As= 0
 Batter Angle, Ab= 0

* Zero Tip Resistance *

The tip resistance is zero

* Zero Friction *

Zero Friction Start: 0 -ft End: 103 -ft

Soil Data:

Depth -ft	Gamma -lb/f3	Phi	C -kp/f2	K -lb/i3	e50 or Dr %	Nspt
0	110	30	0.00	25		5
8	47.6	30	0.00	20		5
25	52.6	0.0	1500	500	.7	11
99	87.6	0.0	300.00	2000	0.04	50

Pile Data:

Depth -ft	Width -in	Area -in2	Per. -in	I -in4	E -kp/i2	Weight -kp/f
0.0	12.875	29.7	40.4	387	29000	0.159
101.0	12.375	120.3	38.9	1151.2	4770	0.125
112.0	12.375	120.3	38.9	1151.2	4770	0.125

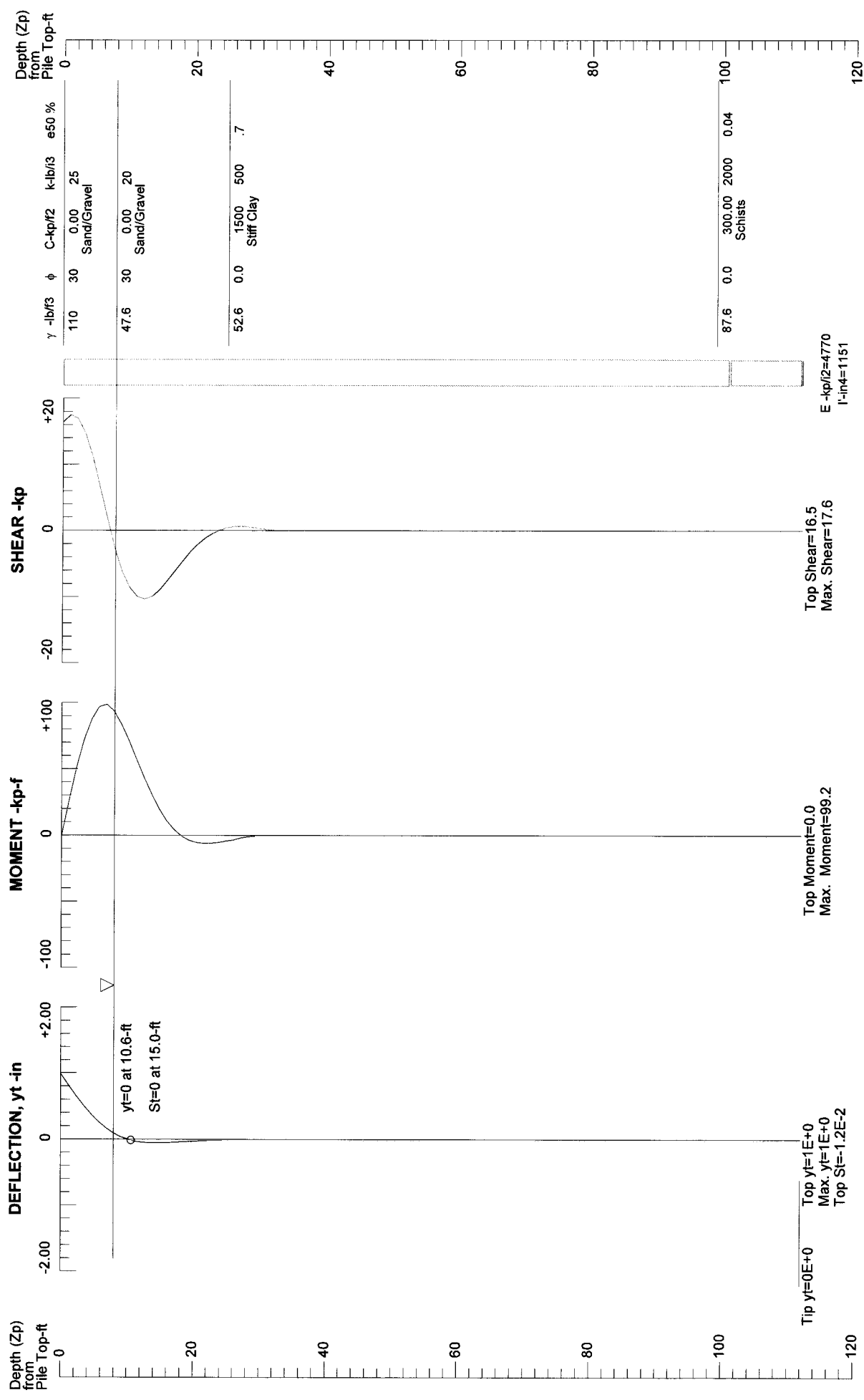
Single Pile Lateral Analysis:

Top Deflection, yt= 1.00000-in
 Max. Moment, M= 99.17-kp-f
 Top Deflection Slope, St= -0.01200
 N/G! Top Deflection, 1.0000-in, Exceeds the Allowable Deflection= 1.00-in

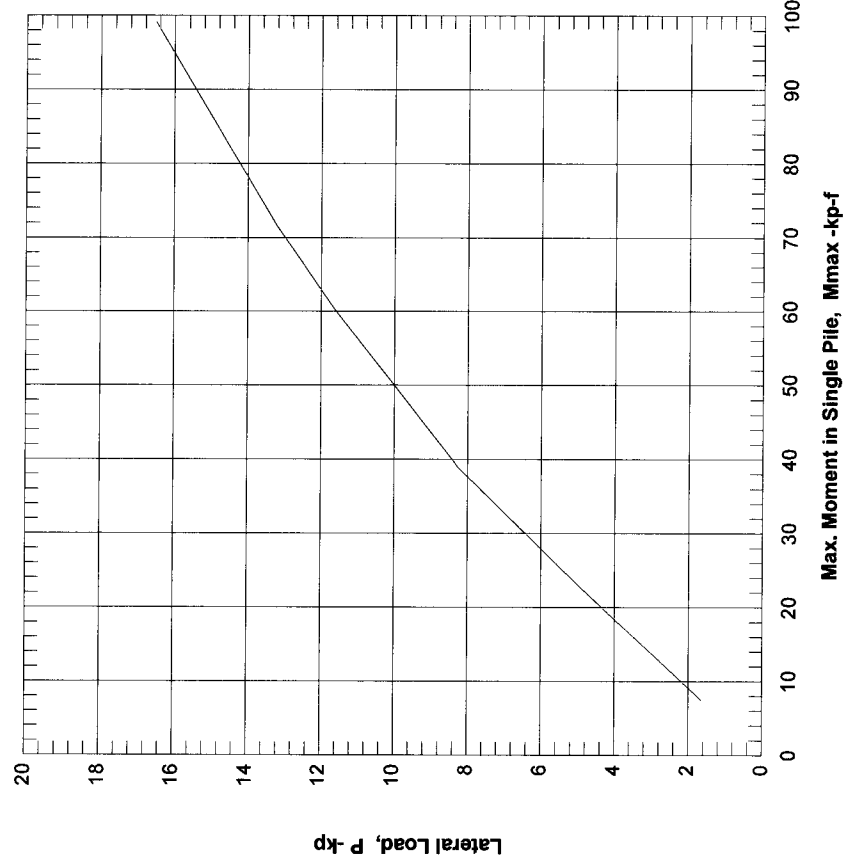
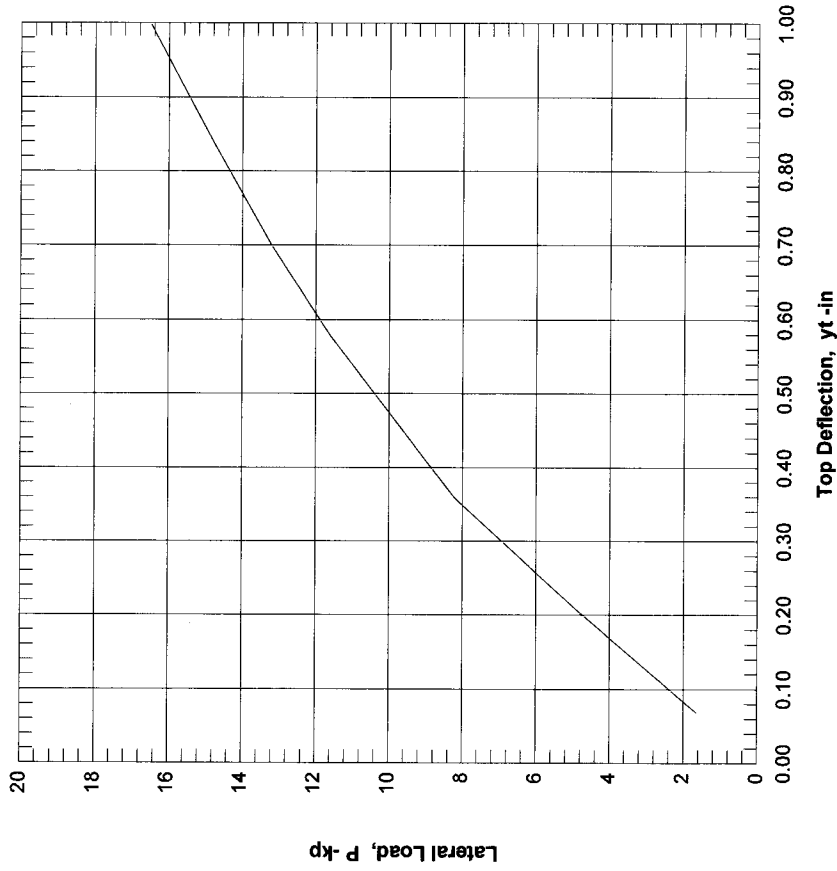
Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.
 The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.

PILE DEFLECTION & FORCE vs DEPTH

Single Pile, $K_{head}=1$, $K_{bc}=1$



LATERAL LOAD vs DEFLECTION & MAX. MOMENT



CLIENT: NYCDDC
 PROJECT: Spring Street Salt Shed
 DETAIL: Micro-caisson capacity evaluation

TASK ID: 9041
 DATE CHK: 6/24/2013
 CHECK BY: JAG

COMP BY: MPS
 DATE: 6/17/2013
 PAGE: 1 of 2

Purpose:
 To evaluate the lateral capacity of the micro-caissons to support salt shed.

Problem:
 Per drawing S-101.00, Caisson Plan dated April 22, 2013, require micro-caisson with allowable capacity of 200 tons and 300 tons.

Reference:
 1. NAVFAC DM7-2
 2. New York City Building Code, July 2008.

Calculations

Allowable lateral load shall be half of the load the load which produces a deflection of 1" at the ground surface.

Deflection at ground surface = $\delta_p = 1$ in
 Casing Outside Diameter = 12.875 in
 Casing Wall Thickness = 0.25 in
 Casing Inside Diameter = 12.375 in
 Length = 100 ft

<-- assume casing loses 0.25 inch of wall thickness due to corrosion
 <-- assume casing loses 0.25 inch of wall thickness due to corrosion

Grout Compressive Strength = 4000 psi

= f_c'

$I_{GROUT} = 1151$ in⁴

= $(\pi/64)(ID)^4$ 142.90757

$I_{CASING} = 198$ in⁴

= $(\pi/64)(OD^4 - ID^4)$ 3.00

$E_{GROUT} = 3600$ ksi

= $57 (f_c')^{0.5}$ 87000

$E_{CASING} = 29000$ ksi

$EI_{GROUT} = 4144320$ kip-in²

$EI_{CASING} = 5731421$ kip-in²

$EI = 9875741$ kip-in²

= $EI_{GROUT} + EI_{CASING}$

$f = 5$ tons/ft³

from Figure 9 pg. 7.2.236

Relative Stiffness Factor = $T = 70$ in

= $(EI / f)^{1/5}$

$L/T = 17$

Deflection Coefficient = $F_\delta = 2.3$

From Figure 11 on pg 7.2-238 $Z=0, L/T > 10$

Load that results in 1" deflection = $P' = 6.6$ ton

= $\delta_p (E \times I) / (F_\delta \times T^3)$

Allowable lateral load = $P = 3.3$ ton

= $P' / 2$

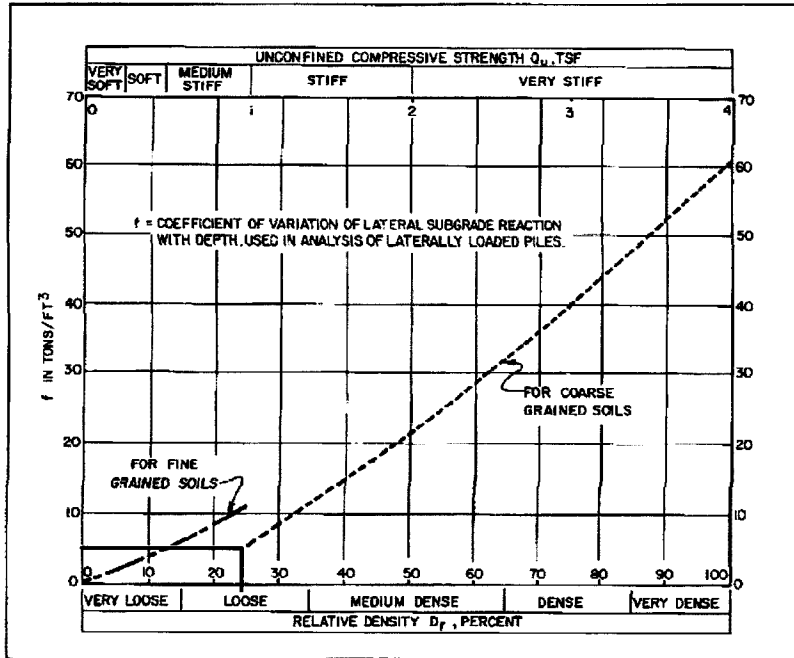


FIGURE 9
 Coefficient of Variation of Subgrade Reaction

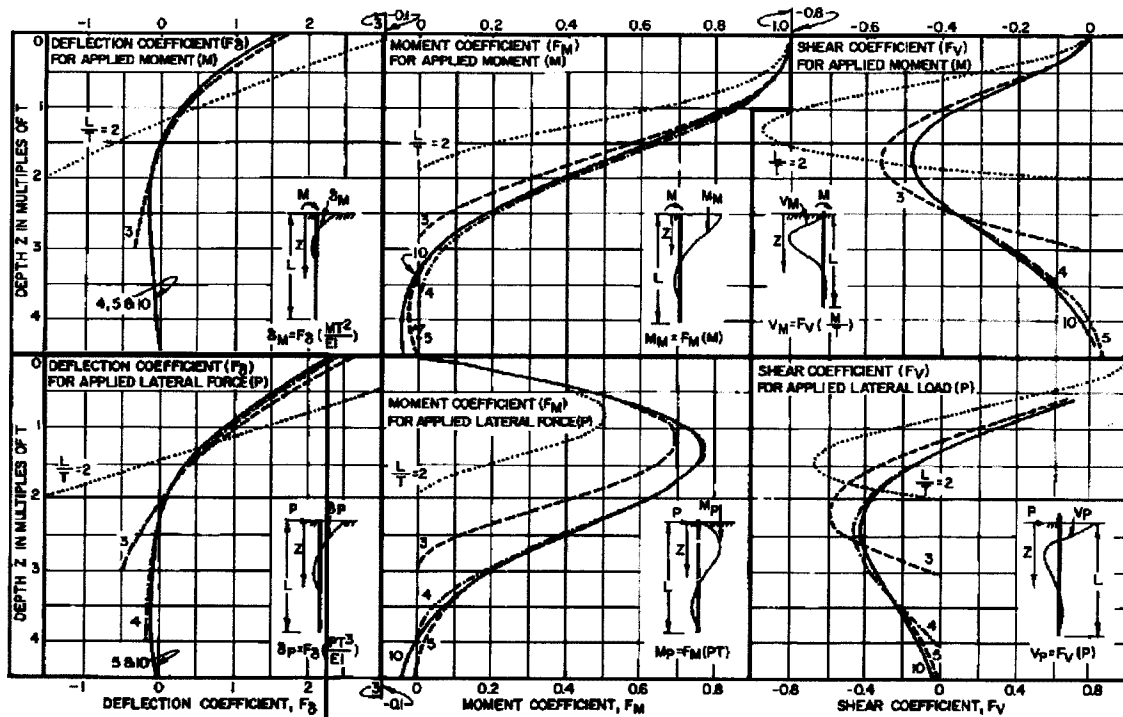


FIGURE 11
 Influence Values for Pile with Applied Lateral Load and Moment
 (Case I. Flexible Cap or Hinged End Condition)

LIQUEFACTION ANALYSIS

Client: NYCCDC
Project: Spring Street Salt Shed
Detail: Liquefaction Analysis

Task Number: 9041
Computed by: MPS
Checked by: JAG

Objective:

To estimate the factor of safety against liquefaction at the proposed salt shed location.

Background:

The proposed construction for the NYDCC consists of a salt shed adjacent to Spring St in Manhattan.

Method/Approach:

The procedure based on "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshop on Evaluation of Liquefaction Resistance of Soils" (Youd, 1998) was used to evaluate the potential for liquefaction during a seismic event.

Fines content estimated based on the lowest fraction derives from the materials field description or by lab test results where available.

Attachments:

- Record of Boring for B-1

Client: MPS&C
 Project: Spring Street Salt Shed
 Design: Expansion Analysis

Test Number: 0041
 Compiled by: MPS
 Checked by: JAG

PROJECT INFORMATION	
Task	9041
Project Name:	Spring Street Salt Shed
Location:	B-1
Date:	6/18/13
Calculated By:	MPS

CALCULATION PARAMETERS	
Design Fault	Local Source
Design Magnitude	5.7
Design PCAm _{ax} (g)	0.148
Design Ground Water Depth (feet)	7.6
Boring Diameter (inches)	4
Standard Sampler, i.e., without a cut out for liners (Y or N)	Y
Hammer Type	
RC = Rope and Cathead	A
WT = Wire Trip	
A = Automatic	
FS for Liquefaction	1.1
Ground Surface Elev. (feet)	5
Design Ground Water Elev. (feet)	-2.6

SUBSURFACE PROFILE									
Layer	Soil Description	Depth to Top of Layer (feet)	γ_{sat} (pcf)	Normed Average Value for Layer	Passing #200 Sieve (%)	Plasticity Index (%)	FS Against Liquefaction	Settlement (inches)	
1	Fill	6	110	4	20		N/A	0.00	
2	Fill	8	110	6	10		2.50	0.00	
3	Fill	10	110	4	5		1.56	0.00	
4	Fill	12	110	5	5		1.61	0.00	
5	Fill	14	110	4	12.7		1.59	0.00	
6	Fill	20	110	10	5		2.47	0.00	
7	Fill	23	110	18	5		4.50	0.00	
8	Silt and Sand	25	110	11	30		3.54	0.00	
9	Silt and Sand	30	110	9	30		2.80	0.00	
10	Silt and Sand	35	110	11	30		3.33	0.00	
11	Silt and Sand	40	110	16	30		4.96	0.00	
12	Silt and Sand	45	110	14	30		4.05	0.00	
13	Silt and Sand	50	110	19	28		5.90	0.00	
14	Silt and Sand	57	110	20	35		7.60	0.00	
15	Silt and Sand	60	110	19	35		6.48	0.00	
16	Silt and Sand	65	110	14	35		4.41	0.00	
17	Silt and Sand	70	110	26	35		N/A	0.00	
18	Silt and Sand	75	110	19	35		6.59	0.00	
19	Silt and Sand	80	110	26	12		6.84	0.00	
20	Silt and Sand	85	110	53	12		N/A	0.00	
21	Silt and Sand	90	110	53	17.3		0.00	0.00	
22	Silt and Sand	95	110	50	17		0.00	0.00	

Dynamic Densification (inches)	0.00
Liquefaction Settlement	0.00

TOTAL SETTLEMENT (inches)	0.00
---------------------------	------

Client: NYCDDC
 Project: Spring Street Salt Shed
 Detail: Liquefaction Analysis

Task Number: 9041
 Computed by: MPS
 Checked by: JAG

Layer	Soil Type Clay or Sand	Depth to Top of Layer (feet)	Layer Thickness (feet)	Depth to Middle of Layer (feet)	Unit Weight (pcf)	Mfield (SPT) Average Value for Layer	Percent Passing #200 Sieve	Total Overburden Pressure at Middle of Layer (psf)	Pore Pressure at Middle of Layer (psf)	Effective Stress at Middle of Layer (psf)	Cn *2	Ce *3	Cb *4	Cr *5	Cs *6	(N1)60 *7	a *7	b *7	(N1)60cs *7	CRR(7.5) *8	Corrected CRR(7.5) *9	rd *10	CSR	Magnitude Scaling Factor *11	FS = CRR(7.5)/ CSR*MSF
1	Fill	6.0	2.0	7.0	110.0	4	20	770.0	0	770	1.81	1.3	1.00	0.75	1.00	6.3	3.615	1.078	10.4	0.12	0.12	0.98	0.09	2.30	N/A
2	Fill	8.0	2.0	9.0	110.0	6	10	980.0	87	903	1.49	1.3	1.00	0.75	1.00	8.7	0.869	1.022	9.8	0.11	0.11	0.98	0.10	2.30	2.50
3	Fill	10.0	2.0	11.0	110.0	4	5	1210.0	212	998	1.42	1.3	1.00	0.75	1.00	5.5	0.000	1.000	5.5	0.08	0.08	0.97	0.11	2.30	1.56
4	Fill	12.0	2.0	13.0	110.0	5	5	1430.0	337	1093	1.35	1.3	1.00	0.75	1.00	6.6	0.000	1.000	6.6	0.08	0.08	0.97	0.12	2.30	1.61
5	Fill	14.0	6.0	17.0	110.0	4	12.7	1870.0	587	1283	1.25	1.3	1.00	0.85	1.00	5.5	1.790	1.035	7.5	0.09	0.09	0.96	0.13	2.30	1.59
6	Fill	20.0	3.0	21.5	110.0	10	5	2365.0	867	1498	1.16	1.3	1.00	0.95	1.00	14.3	0.000	1.000	14.3	0.15	0.15	0.95	0.14	2.296	2.47
7	Fill	23.0	2.0	24.0	110.0	18	5	2640.0	1023	1617	1.11	1.3	1.00	0.95	1.00	24.7	0.000	1.000	24.7	0.29	0.29	0.94	0.15	2.296	4.50
8	Silt and Sand	25.0	5.0	27.5	110.0	11	30	3025.0	1242	1783	1.06	1.3	1.00	0.95	1.00	14.4	4.706	1.154	21.3	0.23	0.23	0.94	0.15	2.296	3.54
9	Silt and Sand	30.0	5.0	32.5	110.0	9	30	3675.0	1554	2021	0.99	1.3	1.00	0.95	1.00	11.1	4.706	1.154	17.5	0.19	0.19	0.91	0.15	2.296	2.80
10	Silt and Sand	35.0	5.0	37.5	110.0	11	30	4125.0	1868	2259	0.94	1.3	1.00	1.00	1.00	13.5	4.706	1.154	20.2	0.22	0.22	0.87	0.15	2.296	3.33
11	Silt and Sand	40.0	5.0	42.5	110.0	16	30	4675.0	2178	2497	0.89	1.3	1.00	1.00	1.00	18.6	4.706	1.154	26.2	0.32	0.32	0.83	0.15	2.296	4.96
12	Silt and Sand	45.0	5.0	47.5	110.0	14	30	5225.0	2490	2735	0.86	1.3	1.00	1.00	1.00	15.6	4.706	1.154	22.7	0.25	0.25	0.79	0.14	2.296	4.05
13	Silt and Sand	50.0	7.0	53.5	110.0	19	28	5885.0	2864	3021	0.81	1.3	1.00	1.00	1.00	20.1	4.562	1.138	27.4	0.35	0.35	0.74	0.14	2.296	5.90
14	Silt and Sand	57.0	3.0	58.5	110.0	20	35	6435.0	3176	3259	0.78	1.3	1.00	1.00	1.00	20.4	5.000	1.200	29.4	0.43	0.43	0.70	0.13	2.296	7.60
15	Silt and Sand	60.0	5.0	62.5	110.0	19	35	6875.0	3426	3449	0.76	1.3	1.00	1.00	1.00	18.8	5.000	1.200	27.6	0.36	0.36	0.67	0.13	2.296	6.48
16	Silt and Sand	65.0	5.0	67.5	110.0	14	35	7425.0	3738	3687	0.74	1.3	1.00	1.00	1.00	13.4	5.000	1.200	21.1	0.23	0.23	0.62	0.12	2.296	4.41
17	Silt and Sand	70.0	5.0	72.5	110.0	28	35	7975.0	4050	3925	0.71	1.3	1.00	1.00	1.00	24.1	5.000	1.200	34.0	N/A	N/A	0.58	0.11	2.296	N/A
18	Silt and Sand	75.0	5.0	77.5	110.0	19	35	8525.0	4362	4163	0.69	1.3	1.00	1.00	1.00	17.1	5.000	1.200	25.5	0.30	0.30	0.54	0.11	2.296	6.59
19	Silt and Sand	80.0	5.0	82.5	110.0	26	12	9075.0	4674	4401	0.67	1.3	1.00	1.00	1.00	22.8	1.554	1.032	25.1	0.29	0.29	0.50	0.10	2.296	6.84
20	Silt and Sand	85.0	5.0	87.5	110.0	53	12	9625.0	4986	4639	0.66	1.3	1.00	1.00	1.00	45.2	1.554	1.032	48.2	N/A	N/A	0.46	0.09	2.296	N/A
21	Silt and Sand	90.0	5.0	92.5	110.0	53	17.3	10175.0	5298	4877	0.64	1.3	1.00	1.00	1.00	44.1	3.081	1.062	49.9	N/A	N/A	0.42	0.08	2.296	N/A
22	Silt and Sand	95.0	N/A	N/A	110.0	50	17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.296	N/A

NOTES:

*1	Unit Weight of Water is assumed to be	62.4	(pcf)
*2	Cn = (1/Effective stress)^(1/2)		
*3	Ce =	1	Value used for calculation
	WT	1	1.3
	A	1.3	
*4	Cb =	0mm to 115mm	1
		115mm to 150mm	1 to 1.05
		150mm to 200mm	1.05 to 1.15
		>200mm	1.15
*5	Cr =	<4m	0.75
		4m to 6m	0.85
		6m to 10m	0.95
		10m to 30m	1
		>30m	<1
*6	Cs =	Standard Sampler, or sampler with space for liners with liners	1
		With space for liners, but no liners	1.2
			Value used for calculation
			1.00

*7	(N1)60cs = a + b(N1)60	FC ≤ 5	a = 0
		5 < FC < 35	a = e^(1.78 - (190/FC^2))
		FC ≥ 35	a = 5.0
		FC ≤ 5	b = 1.0
		5 < FC < 35	b = (0.99 + (FC^1.5/1000))
		FC ≥ 35	b = 1.2
*8	CRR _{7.5} =	$34 - (N1)_{60} + \frac{(N1)_{60}}{135} + \frac{50}{[10 \cdot (N1)_{60} + 45]^2} - 200$	
*9	IF PI of Fines > 15, Increase CRR by 300%		
*10	rd =	z ≤ 9.15m	1.0 - 0.00765z
		z > 9.15m	1.174 - 0.0267z
*11	Magnitude Scaling Factor (NCEER, 1997, mean values)		
	Magnitude	5.5	5.6
	Factor	2.5	2.4
	Magnitude	6.6	6.7
	Factor	1.5	1.4
		5.8	5.7
		6.9	7.0
		7.1	7.2
		7.3	7.4
		1.3	1.2
		1.1	1.1
		6.1	6.2
		6.3	6.4
		6.5	6.6
		1.7	1.6
		7.5	7.4
		1.1	1.0

Client: NYCDDC
Project: Spring Street Salt Shed
Detail: Liquefaction Analysis

Task Number: 9041
Computed by: MPS
Checked by: JAG

Objective:

To estimate the factor of safety against liquefaction at the proposed salt shed location.

Background:

The proposed construction for the NYDCC consists of a salt shed adjacent to Spring St in Manhattan.

Method/Approach:

The procedure based on "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshop on Evaluation of Liquefaction Resistance of Soils" (Youd, 1998) was used to evaluate the potential for liquefaction during a seismic event.

Fines content estimated based on the lowest fraction derives from the materials field description or by lab test results where available.

Attachments:

- Record of Boring for B-2

Client: IN9000
 Project: Spring Street Salt Shed
 Drawn: Liquefaction Analysis

Task Number: 0041
 Computed by: MFG
 Checked by: JAG

PROJECT INFORMATION	
Task	9041
Project Name:	Spring Street Salt Shed
Location:	B-2
Date:	6/18/13
Calculated By:	MPS

CALCULATION PARAMETERS	
Design Fault	Local Source
Design Magnitude	5.7
Design PGAmaz (g)	0.146
Design Ground Water Depth (feet)	8
Boring Diameter (inches)	4
Standard Sampler, i.e., without a cut out for liners (Y or N)	Y
Hammer Type RC = Rope and Catehead WT = Wire Trip A = Automatic	A
FS for Liquefaction	1.1
Ground Surface Elev. (feet)	5
Design Ground Water Elev. (feet)	-3

SUBSURFACE PROFILE							
Layer	Soil Description	Depth to Top of Layer (feet)	γ_{sat} (pcf)	Nspitfield Average Value for Layer	Passing #200 Sieve (%)	Plasticity Index (%)	Settlement (inches)
1	Fill	6	110	4	32		0.00
2	Fill	8	110	5	30		0.00
3	Fill	10	110	2	20		0.00
4	Fill	12	110	9	20		0.00
5	Fill	14	110	4	20		0.00
6	Fill	20	110	7	20		0.00
7	Silt and Sand	25	110	10	35		0.00
8	Silt and Sand	30	110	11	35		0.00
9	Silt and Sand	35	110	7	35		0.00
10	Silt and Sand	40	110	14	41.3		0.00
11	Silt and Sand	45	110	17	35		0.00
12	Silt and Sand	50	110	13	35		0.00
13	Silt and Sand	55	110	15	40		0.00
14	Silt and Sand	60	110	16	35		0.00
15	Silt and Sand	65	110	30	37.3		0.00
16	Silt and Sand	70	110	20	40		0.00
17	Silt and Sand	75	110	16	5		0.00
18	Silt and Sand	80	110	51	20		0.00
19	Silt and Sand	85	110	40	10		0.00
20	Silt and Sand	90	110	64	80		0.00

Dynamic Densification (inches)	0.00
Liquefaction Settlement	0.00

FS Against Liquefaction	0.00
Settlement (inches)	0.00
TOTAL SETTLEMENT (inches)	0.00

Client: NYCDDC
 Project: Spring Street Silt Shed
 Detail: Liquefaction Analysis

Task Number: 9041
 Computed by: MPS
 Checked by: JAG

Layer	Soil Type Clay or Sand	Depth to Top of Layer (feet)	Layer Thickness (feet)	Depth to Middle of Layer (feet)	Unit Weight (pcf)	Nfield (SPT) Average Value for Layer	Percent Passing #200 Sieve	Total Overburden Pressure at Middle of Layer (psf)	Pore Pressure at Middle of Layer (psf)	Effective Stress at Middle of Layer (psf)	Cn *2	Ce *3	Cb *4	Cr *5	Cs *6	(N1)60 *7	a *7	b *7	(N1)60cs *7	CRR(7.5) *8	Corrected CRR(7.5) *9	rd *10	CSR	Magnitude Scaling Factor *11	FS = CRR(7.5)/ CSR*MSF
1	Fill	6.0	2.0	7.0	110.0	4	32	770.0	0	770	1.61	1.3	1.00	0.75	1.00	6.3	4.828	1.171	12.2	0.13	0.13	0.98	0.09	2.30	N/A
2	Fill	8.0	2.0	9.0	110.0	5	30	990.0	62	928	1.47	1.3	1.00	0.75	1.00	7.2	4.706	1.154	13.0	0.14	0.14	0.98	0.10	2.30	3.25
3	Fill	10.0	2.0	11.0	110.0	2	20	1210.0	187	1023	1.40	1.3	1.00	0.75	1.00	2.7	3.615	1.079	6.6	0.08	0.08	0.97	0.11	2.30	1.77
4	Fill	12.0	2.0	13.0	110.0	9	20	1430.0	312	1118	1.34	1.3	1.00	0.75	1.00	11.7	3.615	1.079	16.3	0.17	0.17	0.97	0.12	2.30	3.38
5	Fill	14.0	6.0	17.0	110.0	4	20	1870.0	562	1308	1.24	1.3	1.00	0.85	1.00	5.5	3.615	1.079	9.5	0.11	0.11	0.96	0.13	2.30	1.92
6	Fill	20.0	5.0	22.5	110.0	7	20	2475.0	905	1570	1.13	1.3	1.00	0.95	1.00	13.0	5.000	1.200	14.1	0.15	0.15	0.94	0.15	2.296	2.46
7	Silt and Sand	25.0	5.0	27.5	110.0	10	35	3025.0	1217	1808	0.99	1.3	1.00	1.00	1.00	13.4	5.000	1.200	20.6	0.22	0.22	0.94	0.15	2.296	3.44
8	Silt and Sand	30.0	5.0	32.5	110.0	11	35	3575.0	1529	2046	0.99	1.3	1.00	1.00	1.00	16.2	5.000	1.200	24.4	0.28	0.28	0.83	0.15	2.296	4.44
9	Silt and Sand	35.0	5.0	37.5	110.0	7	35	4125.0	1841	2284	0.94	1.3	1.00	1.00	1.00	18.8	5.000	1.200	27.6	0.36	0.36	0.79	0.14	2.296	5.77
10	Silt and Sand	40.0	5.0	42.5	110.0	14	41.3	4675.0	2153	2522	0.89	1.3	1.00	1.00	1.00	23.9	5.000	1.200	33.4	0.46	0.46	0.71	0.13	2.296	4.62
11	Silt and Sand	45.0	5.0	47.5	110.0	17	35	5225.0	2485	2760	0.85	1.3	1.00	1.00	1.00	28.6	5.000	1.200	39.4	0.54	0.54	0.58	0.11	2.296	7.06
12	Silt and Sand	50.0	5.0	52.5	110.0	13	35	5775.0	2777	2998	0.82	1.3	1.00	1.00	1.00	34.1	5.000	1.200	45.7	0.62	0.62	0.54	0.10	2.296	3.37
13	Silt and Sand	55.0	5.0	57.5	110.0	15	40	6325.0	3089	3236	0.79	1.3	1.00	1.00	1.00	44.6	3.615	1.079	51.7	N/A	N/A	0.50	0.10	2.296	N/A
14	Silt and Sand	60.0	5.0	62.5	110.0	16	35	6875.0	3401	3474	0.76	1.3	1.00	1.00	1.00	51.7	3.615	1.079	51.7	N/A	N/A	0.46	0.09	2.296	N/A
15	Silt and Sand	65.0	5.0	67.5	110.0	30	37.3	7425.0	3713	3712	0.73	1.3	1.00	1.00	1.00	60.0	3.615	1.079	60.0	N/A	N/A	0.46	0.09	2.296	N/A
16	Silt and Sand	70.0	5.0	72.5	110.0	20	40	7975.0	4025	3950	0.71	1.3	1.00	1.00	1.00	70.0	3.615	1.079	70.0	N/A	N/A	0.46	0.09	2.296	N/A
17	Silt and Sand	75.0	5.0	77.5	110.0	16	5	8525.0	4337	4188	0.69	1.3	1.00	1.00	1.00	80.0	3.615	1.079	80.0	N/A	N/A	0.46	0.09	2.296	N/A
18	Silt and Sand	80.0	5.0	82.5	110.0	51	20	9075.0	4649	4426	0.67	1.3	1.00	1.00	1.00	90.0	3.615	1.079	90.0	N/A	N/A	0.46	0.09	2.296	N/A
19	Silt and Sand	85.0	5.0	87.5	110.0	40	10	9625.0	4961	4684	0.65	1.3	1.00	1.00	1.00	100.0	3.615	1.079	100.0	N/A	N/A	0.46	0.09	2.296	N/A
20	Silt and Sand	90.0	N/A	N/A	110.0	64	90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	0	0.0	N/A	N/A	0.0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	0	0.0	N/A	N/A	0.0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTES:

*1	Unit Weight of Water is assumed to be	62.4	(pcf)
*2	Cn = (1/Effective stress (tsf))^1/2		
*3	Ce =	RC	Value used for calculation
		WT	1.3
		A	1.3
*4	Cb =	0mm to 115mm	1
		115mm to 150mm	1 to 1.05
		150mm to 200mm	1.05 to 1.15
		>200mm	1.15
*5	Cr =	<4m	0.75
		4m to 6m	0.85
		6m to 10m	0.95
		10m to 30m	1
		>30m	<1
*6	Cs =	Standard Sampler, or sampler with space for liners with liners	1
		With space for liners, but no liners	1.2
			Value used for calculation
			1.00

*7	(N1)60cs = a + b(N1)60	FC ≤ 5	a = 0									
		5 < FC < 35	a = e ^{(1.76 - (190/FC)²)}									
		FC ≥ 35	a = 5.0									
		FC ≤ 5	b = 1.0									
		5 < FC < 35	b = (0.99 + (FC ^{-1.5} /1000))									
		FC ≥ 35	b = 1.2									
*8	$CRR_{7.5} = \frac{1}{34 - (N_1)_{60}} + \frac{(N_1)_{60}}{135} + \frac{50}{[10 \cdot (N_1)_{60} + 45]^2} - \frac{1}{200}$											
*9	If PI of Fines > 15, Increase CRR by 300%											
*10	rd = 1.0 - 0.00765z											
	z ≤ 9.15m											
	z > 9.15m											
*11	Magnitude Scaling Factor (NCEER, 1997, mean values)											
	Magnitude	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5
	Factor	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.7	1.6
	Magnitude	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	
	Factor	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0

Client: NYCDDC
Project: Spring Street Salt Shed
Detail: Liquefaction Analysis

Task Number: 9041
Computed by: MPS
Checked by: JAG

Objective:

To estimate the factor of safety against liquefaction at the proposed salt shed location.

Background:

The proposed construction for the NYDCC consists of a salt shed adjacent to Spring St in Manhattan.

Method/Approach:

The procedure based on "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshop on Evaluation of Liquefaction Resistance of Soils" (Youd, 1998) was used to evaluate the potential for liquefaction during a seismic event.

Fines content estimated based on the lowest fraction derives from the materials field description or by lab test results where available.

Attachments:

- Record of Boring for B-3

Client: MYCODE
 Project: Spring Street Walk Shed
 Design: Liquefaction Analysis

Task Number: 9041
 Completed by: MPS
 Checked by: JAC

PROJECT INFORMATION	
Task	9041
Project Name:	Spring Street Walk Shed
Location:	B/3
Date:	6/18/13
Calculated By:	MPS

CALCULATION PARAMETERS	
Design Fault	Local Source
Design Magnitude	5.7
Design PGAmax (g)	0.146
Design Ground Water Depth (feet)	7.6
Boring Diameter (inches)	4
Standard Sampler, i.e., without a cut out for liners (Y or N)	Y
Hammer Type	A
RC = Rope and Cathead WT = Wire Trip A = Automatic	
FS for Liquefaction	1.1
Ground Surface Elev. (feet)	5
Design Ground Water Elev. (feet)	-2.6

SUBSURFACE PROFILE									
Layer	Soil Description	Depth to Top of Layer (feet)	γ_{total} (pcf)	N-specified Average Value for Layer	Passing #200 Sieve (%)	Plasticity Index (%)	FS Against Liquefaction	Settlement (inches)	
1	Fill	6	110	11	15		N/A	0.00	
2	Fill	8	110	6	15		2.88	0.00	
3	Fill	10	110	4	15		2.01	0.00	
4	Fill	12	110	5	15		2.06	0.00	
5	Fill	14	110	6	70		2.76	0.00	
6	Silt and Sand	20	110	5	86		N/A	0.00	
7	Silt and Sand	25	110	6	70		2.35	0.00	
8	Silt and Sand	30	110	13	70		4.16	0.00	
9	Silt and Sand	35	110	12	70		3.83	0.00	
10	Silt and Sand	40	110	14	70		4.42	0.00	
11	Silt and Sand	45	110	20	70		N/A	0.00	
12	Silt and Sand	50	110	22	70		N/A	0.00	
13	Silt and Sand	55	110	16	70		4.98	0.00	
14	Silt and Sand	60	110	26	70		N/A	0.00	
15	Silt and Sand	65	110	21	70		8.01	0.00	
16	Silt and Sand	70	110	18	70		5.97	0.00	
17	Silt and Sand	75	110	39	20		N/A	0.00	
18	Silt and Sand	80	110	55	23.1		N/A	0.00	
19	Silt and Sand	85	110	61	20		N/A	0.00	
20	Silt and Sand	90	110	73	20		N/A	0.00	
21	Silt and Sand	95	110	67	20		0.00	0.00	
22							0.00	0.00	

Dynamic Densification (inches)	0.00
Liquefaction Settlement	0.00

TOTAL SETTLEMENT (inches)	0.00
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Client: NYCDDC
 Project: Spring Street Salt Shed
 Detail: Liquefaction Analysis

Task Number: 9041
 Computed by: MPS
 Checked by: JAG

Layer	Soil Type Clay or Sand	Depth to Top of Layer (feet)	Layer Thickness (feet)	Depth to Middle of Layer (feet)	Unit Weight (pcf)	Nfield (SPT) Average Value for Layer	Percent Passing #200 Sieve	Total Overburden Pressure at Middle of Layer (psf)	Pore Pressure at Middle of Layer (psf)	Effective Stress at Middle of Layer (psf)	Cn *2	Ce *3	Cb *4	Cr *5	Cs *6	(N1)60 *7	a *7	b *7	(N1)60cs *7	Corrected CRR(7.5) *8	rd *10	CSR	Magnitude Scaling Factor *11	FS = CRR(7.5)/ CSR*MSF
1	Fill	6.0	2.0	7.0	110.0	11	15	770.0	0	770	1.61	1.3	1.00	0.75	1.00	17.3	2.498	1.048	20.6	0.22	0.98	0.09	2.30	N/A
2	Fill	8.0	2.0	9.0	110.0	6	15	990.0	87	903	1.49	1.3	1.00	0.75	1.00	8.7	2.498	1.048	11.6	0.13	0.98	0.10	2.30	2.88
3	Fill	10.0	2.0	11.0	110.0	4	15	1210.0	212	998	1.42	1.3	1.00	0.75	1.00	5.5	2.498	1.048	8.3	0.10	0.97	0.11	2.30	2.01
4	Fill	12.0	2.0	13.0	110.0	5	15	1430.0	337	1093	1.35	1.3	1.00	0.75	1.00	6.6	2.498	1.048	9.4	0.11	0.97	0.12	2.30	2.06
5	Fill	14.0	6.0	17.0	110.0	6	70	1870.0	587	1283	1.25	1.3	1.00	0.85	1.00	8.3	5.000	1.200	14.9	0.16	0.96	0.13	2.30	2.76
6	Silt and Sand	20.0	5.0	22.5	110.0	5	86	2475.0	930	1545	1.14	1.3	1.00	0.95	1.00	7.0	5.000	1.200	13.4	0.14	0.95	0.14	2.296	N/A
7	Silt and Sand	25.0	5.0	27.5	110.0	6	70	3025.0	1242	1783	1.06	1.3	1.00	0.95	1.00	7.8	5.000	1.200	14.4	0.15	0.94	0.15	2.296	2.35
8	Silt and Sand	30.0	5.0	32.5	110.0	13	70	3575.0	1554	2021	0.99	1.3	1.00	0.95	1.00	16.0	5.000	1.200	24.2	0.28	0.91	0.15	2.296	4.16
9	Silt and Sand	35.0	5.0	37.5	110.0	12	70	4125.0	1866	2259	0.94	1.3	1.00	1.00	1.00	14.7	5.000	1.200	22.6	0.25	0.87	0.15	2.296	3.83
10	Silt and Sand	40.0	5.0	42.5	110.0	14	70	4675.0	2178	2487	0.89	1.3	1.00	1.00	1.00	16.3	5.000	1.200	24.5	0.28	0.83	0.15	2.296	4.42
11	Silt and Sand	45.0	5.0	47.5	110.0	20	70	5225.0	2490	2735	0.86	1.3	1.00	1.00	1.00	22.2	5.000	1.200	31.7	N/A	N/A	0.14	2.296	N/A
12	Silt and Sand	50.0	5.0	52.5	110.0	22	70	5775.0	2802	2973	0.82	1.3	1.00	1.00	1.00	23.5	5.000	1.200	33.1	N/A	N/A	0.14	2.296	N/A
13	Silt and Sand	55.0	5.0	57.5	110.0	16	70	6325.0	3114	3211	0.79	1.3	1.00	1.00	1.00	18.4	5.000	1.200	24.7	0.29	0.71	0.13	2.296	4.98
14	Silt and Sand	60.0	5.0	62.5	110.0	28	70	6875.0	3426	3449	0.78	1.3	1.00	1.00	1.00	25.7	5.000	1.200	35.9	N/A	N/A	0.13	2.296	N/A
15	Silt and Sand	65.0	5.0	67.5	110.0	21	70	7425.0	3738	3687	0.74	1.3	1.00	1.00	1.00	20.1	5.000	1.200	29.1	0.42	0.62	0.12	2.296	8.01
16	Silt and Sand	70.0	5.0	72.5	110.0	18	70	7975.0	4050	3925	0.71	1.3	1.00	1.00	1.00	16.7	5.000	1.200	25.0	0.29	0.58	0.11	2.296	5.97
17	Silt and Sand	75.0	5.0	77.5	110.0	39	20	8525.0	4362	4163	0.69	1.3	1.00	1.00	1.00	35.1	3.615	1.079	41.5	N/A	N/A	0.11	2.296	N/A
18	Silt and Sand	80.0	5.0	82.5	110.0	55	23.1	9075.0	4674	4401	0.67	1.3	1.00	1.00	1.00	48.2	4.071	1.101	57.1	N/A	N/A	0.10	2.296	N/A
19	Silt and Sand	85.0	5.0	87.5	110.0	61	20	9625.0	4988	4639	0.66	1.3	1.00	1.00	1.00	52.1	3.615	1.079	59.8	N/A	N/A	0.08	2.296	N/A
20	Silt and Sand	90.0	5.0	92.5	110.0	73	20	10175.0	4877	4877	0.64	1.3	1.00	1.00	1.00	60.8	3.615	1.079	69.2	N/A	N/A	0.42	0.08	N/A
21	Silt and Sand	95.0	N/A	N/A	110.0	67	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.296	N/A
22	0	0.0	N/A	N/A	0.0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.296	N/A

NOTES:

*1	Unit Weight of Water is assumed to be	62.4	(pcf)
*2	Cn = (1/Effective stress (tsf))^1/2		
*3	Ce =	RC	1
		WT	1
		A	1.3
*4	Cb =	0mm to 115mm	1
		115mm to 150mm	1 to 1.05
		150mm to 200mm	1.05 to 1.15
		>200mm	1.15
*5	Cr =	<4m	0.75
		4m to 6m	0.85
		6m to 10m	0.95
		10m to 30m	1
		>30m	<1
*6	Cs =	Standard Sampler, or sampler with space for liners with liners	1
		With space for liners, but no liners	1.2

*7	(N1)60cs = a + b(N1)60	FC ≤ 5	a = 0									
		5 < FC < 35	a = e^(1.76 - (190/FC^2))									
		FC ≥ 35	a = 5.0									
		FC ≤ 5	b = 1.0									
		5 < FC < 35	b = (0.99 + (FC^1.5/1000))									
		FC ≥ 35	b = 1.2									
*8	$CRR_{7.5} = \frac{1}{34 - (N1)_{60}} + \frac{(N1)_{60}}{135} + \frac{1}{[10 \cdot (N1)_{60} + 45]^2} - \frac{1}{200}$											
*9	If PI of Fines > 15, Increase CRR by 300%											
*10	rd = 1.0 - 0.00765z	z ≤ 9.15m										
		z > 9.15m	1.174 - 0.0267z									
*11	Magnitude Scaling Factor (NCEER, 1997, mean values)											
	Magnitude	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5
	Factor	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.7	1.6
	Magnitude	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	
	Factor	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	

Client: NYCDDC
Project: Spring Street Salt Shed
Detail: Liquefaction Analysis

Task Number: 9041
Computed by: MPS
Checked by: JAG

Objective:

To estimate the factor of safety against liquefaction at the proposed salt shed location.

Background:

The proposed construction for the NYDCC consists of a salt shed adjacent to Spring St in Manhattan.

Method/Approach:

The procedure based on "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshop on Evaluation of Liquefaction Resistance of Soils" (Youd, 1998) was used to evaluate the potential for liquefaction during a seismic event.

Fines content estimated based on the lowest fraction derives from the materials field description or by lab test results where available.

Attachments:

- Record of Boring for B-4

Client: NYCDDC
 Project: Spring Street and Shed
 Details: Liquefaction Analysis

Task Number: 9041
 Computed By: MPS
 Checked By: JAO

PROJECT INFORMATION	
Task	9041
Project Name:	Spring Street and Shed
Location:	B-4
Date:	6/18/13
Calculated By:	MPS

CALCULATION PARAMETERS	
Design Fault	Local Source
Design Magnitude	5.7
Design PGAmax (g)	0.146
Design Ground Water Depth (feet)	7.6
Boring Diameter (inches)	4
Standard Sampler, i.e., without a cut out for liners (Y or N)	Y
Hammer Type RC = Rope and Cathhead WT = Wire Trip A = Automatic	A
FS for Liquefaction	1.1
Ground Surface Elev. (feet)	5
Design Ground Water Elev. (feet)	-2.6

SUBSURFACE PROFILE							
Layer	Soil Description	Depth to Top of Layer (feet)	γ_{total} (pcf)	Nspread Average Value for Layer	Passing #200 Sieve (%)	Plasticity Index (%)	Settlement (inches)
1	Fill	6	110	3	35		N/A
2	Fill	8	110	5	30		3.18
3	Fill	10	110	8	30		3.80
4	Fill	12	110	6	10		1.98
5	Fill	14	110	5	35		2.48
6	Silt and Sand	20	110	10	70		3.83
7	Silt and Sand	25	110	8	80		N/A
8	Silt and Sand	30	110	7	80		N/A
9	Silt and Sand	35	110	12	80		N/A
10	Silt and Sand	40	110	14	80		N/A
11	Silt and Sand	45	110	16	80		N/A
12	Silt and Sand	50	110	25	65		N/A
13	Silt and Sand	55	110	25	90		N/A
14	Silt and Sand	60	110	20	90		N/A
15	Silt and Sand	65	110	16	90		N/A
16	Silt and Sand	70	110	21	90		N/A
17	Silt and Sand	75	110	16	10		3.61
18	Silt and Sand	80	110	52	35		N/A
19	Silt and Sand	85	110	31	8.3		8.69
20	Silt and Sand	90	110	37	5		N/A
21	Silt and Sand	95	110	50	5		N/A

DYNAMIC DENSIFICATION LIQUEFACTION SETTLEMENT	0.00
TOTAL SETTLEMENT (inches)	0.00

Task Number: 9041
 Computed by: MPS
 Checked by: JAG

Client: NYCDDC
 Project: Spring Street Salt Shed
 Detail: Liquefaction Analysis

Layer	Soil Type	Depth to Top of Layer (feet)	Layer Thickness (feet)	Depth to Middle of Layer (feet)	Unit Weight (pcf)	Nfield (SPT) Average Value for Layer	Percent Passing #200 Sieve	Total Overburden Pressure at Middle of Layer (psf)	Pore Pressure at Middle of Layer (psf)	Effective Stress at Middle of Layer (psf)	Cn *2	Ce *3	Cb *4	Cr *5	Cs (N1)60 *6	(N1)60 *7	a *7	b *7	(N1)60cs *7	Corrected CRR(7.5) *9	rd *10	CSR	Magnitude Scaling Factor *11	FS = CRR(7.5) / CSR *MSF
1	Fill	6.0	2.0	7.0	110.0	3	35	770.0	0	770	1.61	1.3	1.00	0.75	1.00	4.7	5.000	1.200	10.7	0.12	0.98	0.09	2.30	N/A
2	Fill	8.0	2.0	9.0	110.0	5	30	990.0	87	903	1.49	1.3	1.00	0.75	1.00	7.3	4.706	1.154	13.1	0.14	0.98	0.10	2.30	3.18
3	Fill	10.0	2.0	11.0	110.0	8	30	1210.0	212	998	1.42	1.3	1.00	0.75	1.00	11.0	4.706	1.154	17.5	0.19	0.97	0.11	2.30	3.80
4	Fill	12.0	2.0	13.0	110.0	6	10	1430.0	337	1093	1.35	1.3	1.00	0.75	1.00	7.9	0.869	1.022	9.0	0.10	0.97	0.12	2.30	1.98
5	Fill	14.0	6.0	17.0	110.0	5	35	1870.0	587	1283	1.25	1.3	1.00	0.85	1.00	6.9	5.000	1.200	13.3	0.14	0.96	0.13	2.30	2.48
6	Silt and Sand	20.0	5.0	22.5	110.0	10	70	2475.0	990	1545	1.14	1.3	1.00	0.95	1.00	14.1	5.000	1.200	21.9	0.24	0.94	0.15	2.296	3.83
7	Silt and Sand	25.0	5.0	27.5	110.0	8	80	3025.0	1242	1783	1.06	1.3	1.00	0.95	1.00	10.5	5.000	1.200	17.6	0.19	0.94	0.15	2.296	N/A
8	Silt and Sand	30.0	5.0	32.5	110.0	7	80	3575.0	1554	2021	0.99	1.3	1.00	0.95	1.00	8.6	5.000	1.200	15.3	0.16	0.91	0.15	2.296	N/A
9	Silt and Sand	35.0	5.0	37.5	110.0	12	80	4125.0	1866	2259	0.94	1.3	1.00	1.00	1.00	14.7	5.000	1.200	22.6	0.25	0.87	0.15	2.296	N/A
10	Silt and Sand	40.0	5.0	42.5	110.0	14	80	4675.0	2178	2497	0.89	1.3	1.00	1.00	1.00	16.3	5.000	1.200	24.5	0.28	0.83	0.15	2.296	N/A
11	Silt and Sand	45.0	5.0	47.5	110.0	16	80	5225.0	2490	2735	0.86	1.3	1.00	1.00	1.00	17.8	5.000	1.200	26.3	0.32	0.79	0.14	2.296	N/A
12	Silt and Sand	50.0	5.0	52.5	110.0	25	65	5775.0	2802	2973	0.82	1.3	1.00	1.00	1.00	26.7	5.000	1.200	37.0	N/A	N/A	0.14	2.296	N/A
13	Silt and Sand	55.0	5.0	57.5	110.0	25	90	6325.0	3114	3211	0.79	1.3	1.00	1.00	1.00	25.6	5.000	1.200	35.8	N/A	N/A	0.13	2.296	N/A
14	Silt and Sand	60.0	5.0	62.5	110.0	20	90	6875.0	3426	3449	0.76	1.3	1.00	1.00	1.00	19.8	5.000	1.200	28.8	0.40	0.67	0.13	2.296	N/A
15	Silt and Sand	65.0	5.0	67.5	110.0	16	90	7425.0	3738	3687	0.74	1.3	1.00	1.00	1.00	15.3	5.000	1.200	23.4	0.26	0.62	0.12	2.296	N/A
16	Silt and Sand	70.0	5.0	72.5	110.0	21	90	7975.0	4050	3925	0.71	1.3	1.00	1.00	1.00	19.5	5.000	1.200	28.4	0.38	0.58	0.11	2.296	N/A
17	Silt and Sand	75.0	5.0	77.5	110.0	16	10	8525.0	4362	4163	0.69	1.3	1.00	1.00	1.00	14.4	0.869	1.022	15.6	0.17	0.54	0.11	2.296	3.61
18	Silt and Sand	80.0	5.0	82.5	110.0	52	35	9075.0	4674	4401	0.67	1.3	1.00	1.00	1.00	45.6	5.000	1.200	59.7	N/A	N/A	0.10	2.296	N/A
19	Silt and Sand	85.0	5.0	87.5	110.0	31	8.3	9625.0	4988	4639	0.66	1.3	1.00	1.00	1.00	26.5	0.369	1.014	27.2	0.34	0.46	0.09	2.296	8.69
20	Silt and Sand	90.0	5.0	92.5	110.0	37	5	10175.0	5296	4877	0.64	1.3	1.00	1.00	1.00	30.8	0.000	1.000	30.8	N/A	N/A	0.08	2.296	N/A
21	Silt and Sand	95.0	N/A	N/A	110.0	50	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.296	N/A
22	0	0.0	N/A	N/A	0.0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.296	N/A

*7 (N1)60cs = a + b(N1)60
 a = 0
 5 < FC < 35 a = e^a(1.76 - (190/FC²))
 FC ≥ 35 a = 5.0
 b = 1.0
 5 < FC < 35 b = (0.99 + (FC*1.5/1000))
 FC ≥ 35 b = 1.2

*8
$$CRR_{7.5} = \frac{1}{34 - (N_1)_{60}} + \frac{(N_1)_{60}}{135} + \frac{50}{[10 \cdot (N_1)_{60} + 45]^2} - \frac{1}{200}$$

*9 If PI of Fines > 15, increase CRR by 300%
 rd = 1.0 - 0.00765z
 z ≤ 8.15m
 z > 9.15m
 1.174 - 0.02687z

*11 Magnitude Scaling Factor (NCEER, 1997, mean values)

Magnitude	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5
Factor	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.7	1.6
Magnitude	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.5
Factor	1.5	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0

NOTES:

*1 Unit Weight of Water is assumed to be 62.4 (pcf)

*2 Cn = (1/Effective stress (tsf))^1/2

*3 RC Value used for calculation
 WT 1
 A 1.3

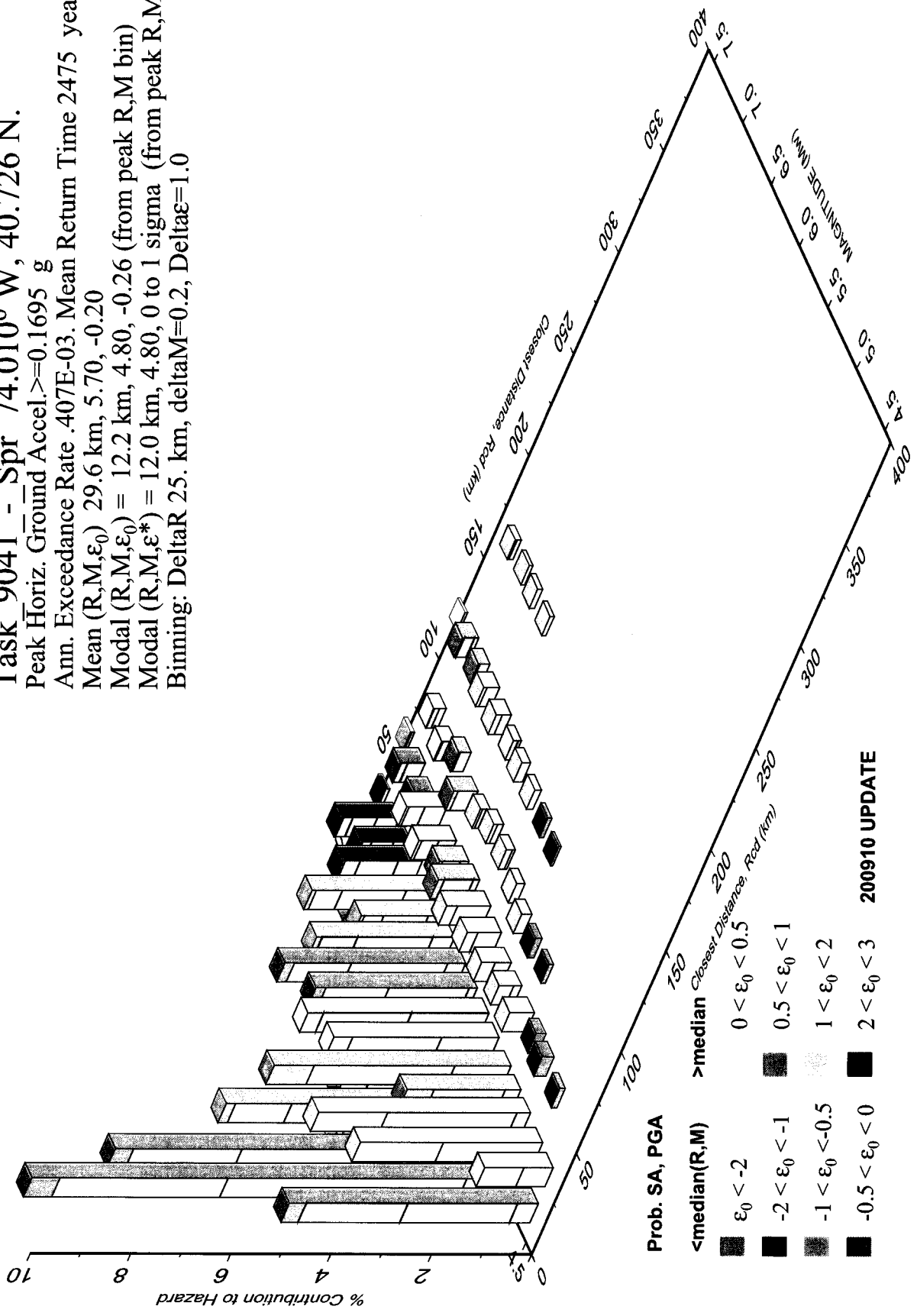
*4 Cb = 0mm to 115mm 1
 115mm to 150mm 1 to 1.05
 150mm to 200mm 1.05 to 1.15
 >200mm 1.15

*5 Cr = <4m 0.75
 4m to 6m 0.85
 6m to 10m 0.95
 10m to 30m 1
 >30m <1

*6 Cs = Standard Sampler, or sampler with space for liners with liners 1 Value used for calculation
 With space for liners, but no liners 1.2 Value used for calculation
 1.00

**PSH Deaggregation on NEHRP BC rock
Task 9041 - Spr 74.010° W, 40.726 N.**

Peak Horiz. Ground Accel. ≥ 0.1695 g
 Ann. Exceedance Rate .407E-03. Mean Return Time 2475 years
 Mean (R, M, ϵ_0) 29.6 km, 5.70, -0.20
 Modal (R, M, ϵ_0) = 12.2 km, 4.80, -0.26 (from peak R, M bin)
 Modal (R, M, ϵ^*) = 12.0 km, 4.80, 0 to 1 sigma (from peak R, M, ϵ bin)
 Binning: DeltaR 25. km, deltaM=0.2, Delta ϵ =1.0



FMS ID: S195-227S



**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

Spring Street Salt Shed Construction

**LOCATION: 553 Canal Street
BOROUGH: Manhattan 10013
CITY OF NEW YORK**

Contractor _____

Dated _____, 20____

Entered in the Comptroller's Office _____

First Assistant Bookkeeper _____

Dated _____, 20____

