NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

PROJECT ID: **HL82SIABE**

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 1 OF 3

BID BOOKLET

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

Staten Island Animal Care and Control Center Reconstruction

LOCATION: **3139 Veterans Road West**
BOROUGH: **Staten Island 10309**
CITY OF NEW YORK

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

Department of Health & Mental Hygiene

Garrison Architects

Date: **January 8, 2013**

13-004

NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

DAVID J. BURNEY, FAIA
Commissioner

CAROL DIAGOSTINO
Agency Chief
Contracting Officer

September 24, 2013

CERTIFIED MAIL - RETURN RECEIPT REQUEST
MINELLI CONSTRUCTION CO., INC.
300 Corporate Plaza
Islandia, NY 11749

RE: FMS ID: HL82SIABE
E-PIN: 85013B0051001
DDC PIN: 8502013HL0001C
STATEN ISLAND ANIMAL CARE AND
CONTROL CENTER RECONSTRUCTION
NOTICE OF AWARD

Dear Contractor:

You are hereby awarded the above referenced contract based upon your bid in the amount of $5,930,000.00 submitted at the bid opening on April 16, 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,

Carol DiAgostino

30 - 30 Thomson Ave L.I.C., NY 11101 Telephone: (718) 391-1501 Facsimile: (718) 391-1885 www.nyc.gov/buildnyc

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

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

PROJECT ID: HL82SIABE

Staten Island Animal Care and Control Center Reconstruction
3139 Veterans Road West
Staten Island 10309

Name of Bidder: Minelli Construction Co Inc

Date of Bid Opening: 4/16/13

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

Place of Business of Bidder: 300 Corporate Plaza Islandia NY

Bidder's Telephone Number: 6312320222 Bidder's Fax Number: 631 232 0323

Bidder's Email Address: Erin@minelliconstruction.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: John Gertonson, Bayport, NY

Name and Home Address of Secretary: Joseph Spano St James, NY

Name and Home Address of Treasurer: John Gertonson, Bayport, NY

BID FORM

Minelli Construction Co Inc

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 15 of this Bid Booklet.

The bidder hereby affirms that is 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:

BID FORM

PROJECT ID: HL82SIABE

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, excluding item (B) 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 Labor		Total Price for Material Sold and Delivered		
$ 300000	+	$ 2980,00	Total Price for Item A	$ 5,980,00

B. ALLOWANCE for Incidental Asbestos Abatement (Section 028013 of the Specifications) **$15,000.00**

TOTAL BID PRICE (Add A + B) (a/k/a BID PROPOSAL) $ 5,995,000

4/16/13 P.8

BIDDER'S SIGNATURE AND AFFIDAVIT

WARNING!! Failure to comply with items below will result in the rejection of your bid.

* **SUBCONTRACTORS: You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (See 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**

* **MWBE GOALS: You MUST complete and submit the Affirmations contained in the Subcontractor Utilization Plan (See Page 7), or a pre-approved waiver (See Page 9), at the time you submit your bid. You must submit the Affirmations (or a pre-approved waiver) in BID ENVELOPE #1.**

Bidder: Minelli Construction Co Inc

By: _____
(Signature of Partner or corporate officer)

_____
Secretary of Corporate Bidder

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

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 New York ss:
Joseph Spano being duly sworn says:
I am the V.P of the above named corporation whose name is subscribed to and which executed the foregoing bid. I reside at St. James, NY.
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
11th day of April, 2013

_____
Notary Public

CAROLE FASANO
Notary Public, State of New York
Qualified in Suffolk County
No. 01FA6234012
Commission Expires May 11, 2015

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: Minelli Construction Co Inc
Address: 300 Corporate Plaza
City: Islandia State: NY Zip Code: 11749

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
11-2608413

By: _____
Signature:

Title: V.P.

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.

Qualification Form

Project ID: HL82SIABE

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: PLEASE SEE ATTACHED

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: _____

MINELLI CONSTRUCTION CO., INC. PROJECTS COMPLETED WITHIN THE LAST FIVE YEARS:

Project	Contractor	Owner and Contract Contact	Contract No. & Amount	Date Started	Contract Time	% Work Completed as of this date	Prime or Sub	Scope of Work	Orig. Schedule Completion	Actual Completion
180th Street	Citnalta Construction Corp. 1182 East 180th St. Bronx, NY 10460	MTA Cinalta Construction / Mike Piazzola 631-563-1110	A-35985/6 $1,400,000	2/27/2011		100%	Sub	Stucco repair & Masonry work		2/17/2012
2nd Avenue Subway / 96th St. Station	EE Cruz & Tully Construction Co. JV 943 Holmdel Road, Cruz Plaza Holmdel, NJ 07733	MTA EE Cruz / D. Desai 212-289-4212	C-26005 $432,619.94	9/13/2011		100%	Sub	Masonry restoration		11/27/2012
Battery Tunnel Manhattan Blower & Underground Exhaust Bldgs.	Triborough Bridge & Tunnel Authority C/O MTA Risk & Insurance Management Standards Enforcement & Claims Management 2 Broadway - 21st Floor New York, NY 10004	MTA Harold Booth 646-252-7052	BB-80AM 7,300,000.00	11/2/2007	18 months	100%	Prime	Bldg Repairs @ Brooklyn	5/3/2009	5/3/2009
Bowery Bay	Skanska USA Civil Northeast Inc. 18-55 Steinway Street Astoria, NY 11105, United States	NYCDEP Christina Quinn	BB-59G $490,500	4/16/2009		100%	Sub	Block work		1/31/2011
Brooklyn Bridge Rehabilitation of Approach Spans	Skanska Koch 55 Washington St. Suite 552 Brooklyn, NY 11201	NYCDOT Megan Heugle of Skanska 732-969-1700	BRC270C/P $140,080	3/1/2010		100%	Sub	Stone work		8/30/2010
Delta Baggage System	VRH 320 Grand Avenue Englewood, NJ 07631	Port Authority VRH /John Strack 201-871-4422	BO-2422-008S $446,500	5/21/2012		100%	Sub	New block work & brick replacement		1/24/2013
DOE - Division of School	Komi Construction, Inc. 5717 2nd Avenue Brooklyn, NY 11220	NYCSCA Anus Hashmi of Komi Construction 718-492-7626 ext. 23	C000011248 $1,614,280	10/1/2009		100%	Sub	Masonry restoration		4/1/2011
FDR Drive	NYSDOT Slattery/Skanska Vinny Kraus (646) 467-7264	NYSDOT Slattery/Skanska Vinny Kraus (646) 467-7264	D258876 $869,500.00	8/31/2022		100%	Sub	Masonry, Tile & Concrete		8/31/2007
Henry Hudson Monument	City of New York Parks & Recreation Flushing Meadows / Corona Park Omstead Center, Flushing NY 11368	NYC Dept. of Parks Fred Hemmerling 718-760-6827	X180-109M $599,018.75	12/22/2009		100%	Prime	Shotcrete		11/2/2010
Hunter College - Thomas Hunter Hall	Dormitory Authority State of New York 695 Park Ave West Bldg. Suite 103B New York, NY 10021	DASNY Ed Wagner 646-208-9148	Contract# 150016 Project# 273830 $9,914,000	9/1/2010		100%	Prime	Façade Restoration, Roof & Window Restoration, Asbestos Abatement		9/1/2011
IS 144	NYCSCA 30-30 Thompson Avenue Long Island City, NY 11101-3045	NYCSCA Tracy Ray 718-472-8000	C000011925 $4,891,000	7/1/2012	540 calendar days	100%	Prime	Exterior coating of existing façade and roofing and masonry restoration		9/1/2012
Jones Beach State Park Water Tower Repairs	NYS Parks Recreation & Historic Preservation	NYS Parks Recreation & Historic Preservation Kevin Mee 631-321-3775	D003714 $6,154,804	7/8/2008	420 calendar days	100%	Prime	Concrete/Masonry		5/1/2011
LI 13 Bridges	Posillico 1750 New Highway Farmingdale, NY 11735	NYSDOT Fred Locher @ Posillico Civil 631-249-1872	D261544 $830,051	8/1/2011		100%	Sub	Concrete repair & shotcrete		10/8/2012
Metropolitan High School	NYCSCA 30-30 Thompson Avenue Long Island City, NY 11101-3045	NYCSCA Calvin Steel 718-472-8000	C000011950 $5,186,000.00	7/10/2010	540 calendar days	100%	Prime	Roofing, masonry restoration and some interior repair		9/22/2012
Morris High School	NYCSCA 30-30 Thompson Avenue Long Island City, NY 11101-3045	NYCSCA Ricardo Rivera 347-865-0764	C000010868 $14,820,000.00	6/8/2008	730 calendar days	100%	Prime	Concrete/Masonry		5/1/2011

MINELLI CONSTRUCTION CO., INC. PROJECTS COMPLETED WITHIN THE LAST FIVE YEARS:

Project	Contractor	Owner and Contract Contact	Contract No. & Amount	Date Started	Contract Time	% Work Completed as of this date	Prime or Sub	Scope of Work	Orig. Schedule Completion	Actual Completion
Mosholu Golf Course	Schiavone Construction / John P. Picone 150 Meadowlands Parkway Secaucus, NJ 07094	Port Authority NY & NJ Vinny Citro 201-867-5070	CRO-313 $10,500	3/9/2012		100%	Sub	Stone repair		3/20/2012
Ocean Bay Apartments	LIRO GROUP 3 Aerial Way Syosset, NY 11791	NYC Housing Authority Joe Massa 516-214-8132	CM5013797 $3,099,000	2/1/2011		100%	Prime	Masonry restoration		7/1/2011
Plaza Substation	Tutor Perini Corporation 1000 Main Street New Rochele, NY 10801	MTA Tutor Perini / Kevin J. Woods 914-739-1908	CQ032 $292,267.00	4/3/2012		100%	Sub	Concrete repair		10/20/2012
Prospect Park	Unicom Construction Enterprises, Inc. 305 W Grand Ave Suite 600 Montvale, NJ 07645	NYC DOT Unicom / Michelli Soriano 201-782-9100	UCE 226 / HBCR00 $75,206.25	6/4/2012		100%	Sub	Masonry repointing		7/7/2012
PS 173	Komi Construction, Inc. 5717 2nd Avenue Brooklyn, NY 11220	NYCSCA Anus Hashmi of Komi Construction 718-492-7626 ext. 23	C000010531 $1,101,242	12/1/2010		100%	Sub	Exterior repair		4/1/2011
Route I-684	Grace Industries, LLC 11 Commercial Street Plainview, NY 11803	NYSDOT Ed Bessim @ Grace Industries 516-336-6720	D261588 $80,135	10/1/2011		100%	Sub	Concrete repair		12/9/2011
Rt 9W over Cedar Brook	Harrison & Burrowes Box 355 Glenmont, NY 12077	NYSDOT Stephen Avveduti Harrison & Burrows 518-465-6254	D261024 $335,560	10/1/2009		100%	Sub	Concrete repair		10/20/2009
South Shore Bridges	Weeks Marine, Inc. Field 10 Jones BeachState Park Wantagh, NY 11793	NYSDOT Brian Clark of Weeks Marine 516-409-4060	D261483 $99,700	8/1/2011		100%	Sub	Concrete repair		12/30/2011

Tax ID #: 11-2608413

PIN#: 8502013HL0001C

Contract # 1 - General Construction Work

The City of New York

SCHEDULE B: Subcontractor Utilization Plan -Part I: Agency's Target

This page to be completed by contracting agency

Contract Overview

Pin #	8502013HL0001C	**FMS Project ID#:**	HL82SIABE
Project Title	Staten Island Animal Care and Control Center Reconstruction		
Contracting Agency	Department of Design and Construction		
Agency Address	30-30 Thomson Avenue	**City** Long Island City **State** NY	**Zip Code** 11101
Contact Person	Norma Negron	**Title** MWBE Liaison & Compliance Analyst	
Telephone #	(718) 391-1502	**Email** negronn@ddc.nyc.gov	

Project Description

This project consists of the reconstruction of a 5065 square foot single story Animal Care Center to include General Construction work, Plumbing work, HVAC and Fire Protection work, and Electrical work.

(1) √ **Target Subcontracting Percentage**

Percentage of total contract dollar value that agency estimates will be awarded to subcontractors in amounts under $1 million for construction and professional services. 40 %

Subcontractor Participation Goals

Group	Construction	Professional Services
Black American	Unspecified %	%
Hispanic American	Unspecified %	%
Asian American	Unspecified %	No Goal
Caucasian Female	No Goal	%
Total Participation Goals	(2) 20 %	(3) %

* Note: For this procurement, individual ethnicity and gender goals are not specified. The Total Participation Goals for construction subcontracts may be met by using Black American, Hispanic American or Asian American firms or any combination of such firms.

Tax ID #: 11-2608413 PIN#: HL825|ABE

SCHEDULE B - Subcontractor Utilization Plan -- Part II: Bidder/Proposer Subcontracting Plan

This page and the next (Part II herein) are to be completed by the bidder/proposer. AFFIRMATIONS; Bidder/proposer must check the applicable boxes below, affirming compliance with M/WBE requirements.

Bidder/proposer [X] AFFIRMS or [ ] DOES NOT AFFIRM [statement below]

It is a material term of the contract to be awarded that, with respect to the total amount of the contract to be awarded, bidder/proposer will award one or more subcontracts for amounts under one million dollars, sufficient to meet or exceed the Target Subcontracting Percentage (as set forth in Part I) unless it obtains a full or partial waiver thereof, and it will award subcontracts sufficient to meet or exceed the Total Participation Goals (as set forth in Part I) unless such goals are modified by the Agency.

Bidder/proposer

[X] AFFIRMS that it intends to meet or exceed the Target Subcontracting Percentage (as set forth in Part 1); or

[ ] AFFIRMS that it has obtained a full/partial pre-award waiver of the Target Subcontracting Percentage (as set forth in Part I) and intends to award the modified Target Subcontracting Percentage, if any; or

[ ] DOES NOT AFFIRM

Section I: Prime Contractor Contact Information

Tax ID # 11-2608413 FMS Vendor ID #

Business Name Minelli Construction Contact Person J. Spano

Address 300 Corporate Plaza Islandia NY 11749

Telephone # 631 232-0222 Email Erin@minelliconstruction.com

Section II: General Contract Information

1. **Define the industry in which work is to be performed.**
   - **Construction** includes all contracts for the construction, rehabilitation, and/or renovation of physical structures. This category does include CM Build as well as other construction related services such as: demolition, asbestos and lead abatement, and painting services, carpentry services, carpet installation and removal, where related to new construction and not maintenance.
   - **Professional Services** are a class of services that typically require the provider to have some specialized field or advanced degree. Services of this type include: legal, management consulting, information technology, accounting, auditing, actuarial, advertising, health services, pure construction management, environmental analysis, scientific testing, architecture and engineering, and traffic studies, and similar services.

a. Type of work on Prime Contract *(Check one)*: [X] Construction [ ] Professional Services

b. Type of work on Subcontract *(Check all that apply)*: [X] Construction [ ] Professional Services [ ] Other

2. What is the expected percentage of the total contract dollar value that you expect to award to all subcontracts? 40 %

3. Will you award subcontract(s) in amounts below $ 1 million for construction and/or professional services contracts within the first 12 months of the notice to proceed on the contract? [X] Yes [ ] No

Section III: Subcontractor Utilization Summary

IMPORTANT: *If you do not anticipate that you will subcontract at the target level the agency has specified, because you will perform more of the work yourself, you must seek a waiver of the Target Subcontracting Percentage by completing p. 9).*

Step 1: Calculate the percentage (of your total bid) that will go towards subcontracts under $1M for construction and/or professional services	Subcontracts under $1M (4) (construction/professional services)		Total Bid/Proposal Value		Calculated Target Subcontracting Percentage
	$2,392,000	÷	$5,980,000	x 100 =	40 %

- **Subcontracts under $1M (construction/professional services):** Enter the value you expect to award to subcontractors in dollars for amounts under $1 million for construction and/or professional services. This value defines the amount that participation goals apply to, and will be entered into the first line of Step 2.
- **Total Bid/Proposal Value:** Provide the dollar amount of the bid/proposal.
- **Calculated Target Subcontracting Percentage:** The percentage of the total contract dollar value that will be awarded to one or more subcontractors for amounts under $1 million for construction and/or professional services. **This percentage must equal or exceed the percentage listed by the agency on page 1, at line (1).**

NOTE: The "Calculated Target Subcontracting Percentage" MUST equal or exceed the Target Subcontracting Percentage listed by the agency on Page 6, Line (1).

Tax ID #: 11-2608413 PIN#: HL82 SLABE

SCHEDULE B - cont.

Step 2:
Calculate value of subcontractor participation goals

		Subcontracts under $1M (construction/professional services)	
a.	Copy value from Step 1, line (4) – the total value of all expected subcontracts under $1M for construction and/or professional services	$ 2,392,000	
b.	* From line a. above, allocate the dollar value of "Subcontracts under $1M" by Construction and Professional Services, * If all subcontracts under $1M are in one industry, enter '0' for the industry with no subcontracts. * Amounts listed on these lines should add up to the value from line a.	**Construction**	**Professional Services**
	Subcontracts under $1M by Industry	$ 2,392,000	$ 0
	* For Construction enter percentage from line (2) from Page 6. * For Professional Services enter percentage from line (3) from Page 6.		
c.	* **Total Participation Goals Percentages must be copied from Part I, lines (2) and (3).** **Total Participation Goals**	x 20 %	x 0 %
d.	**Value of Total Participation Goals**	$ 478,400	$ 0

Step 3:

☑ **Subcontracts in Amounts Under $1 M Scope of Work – Construction** Roofing-85,000

Enter brief description of type(s) of subcontracts in amounts under $1M anticipated, by type of work, not by name of subcontractor.
Plumbing - 538,537 Asbestos, 55,000 Electric - 1,031,816 HVAC 704,702

☑ **Subcontracts in Amounts Under $1 M Scope of Work – Professional Services**

Enter brief description of type(s) of subcontracts in amounts under $1M anticipated by type of work, not by name of subcontractor.
N/A

Section IV: Vendor Certification and Required Affirmations

I hereby 1) acknowledge my understanding of the M/WBE requirements as set forth herein and the pertinent provisions of Local Law 129 of 2005, and the rules promulgated thereunder; 2) affirm that the information supplied in support of this subcontractor utilization plan is true and correct; 3) agree, if awarded this Contract, to comply with the M/WBE requirements of this Contract and the pertinent provisions of Local Law 129 of 2005, 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 subcontract(s) sufficient to meet the Target Subcontracting Percentage, unless a waiver is obtained, and the Vendor will award subcontract(s) sufficient to meet the Total Participation Goals unless such goals are modified by the Agency; and 5) agree and affirm, if awarded this contract the Vendor intends to make all reasonable, good faith efforts to meet the Target Subcontracting Percentage, or if the Vendor has obtained a waiver, the Vendor intends to meet the modified Target Subcontracting Percentage, if any, and the Vendor intends to to solicit and obtain the participation of M/WBEs so as to meet the Total Participation Goals unless modified by the Agency.

Signature _____ Date 4/16/13
Print Name Joseph Spano Title VP

BID BOND 1
FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, _____

Minelli Construction Co., Inc.

300 Corporate Plaza, Islandia, NY 11749

hereinafter referred to as the "Principal", and _____

Fidelity and Deposit Company of Maryland

300 Interpace Pkwy., Morris Corp. I, Bldg. B/C, Parsippany, NJ 07054

hereinafter referred to as the "Surety" are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "CITY", or to its successors and assigns in the penal sum of

Ten Percent of Amount Bid

($ 10%), 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 _____

Staten Island Animal Care and Control Center Reconstruction- Project HL82SIABE

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 the time within which the City may accept the Principal's Proposal, or by any waiver by the City of any of the requirements of the Information for Bidders, and the Surety hereby waives notice of any such postponements, extensions, or waivers.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the 28th day of March, 2013.

(Seal)

Minelli Construction Co., Inc. (L.S.)
Principal

By: _____

(Seal)

Fidelity and Deposit Company of Maryland
Surety

By: _____
Marnie Ginsburg Attorney-in-Fact

BID BOND 3

ACKNOWLEDGMENT OF PRINCIPAL. IF A CORPORATION

State of New York County of Suffolk ss.

On this 16th day of April, 2013, before me personally came Joseph Spano to me known, who, being by me duly sworn, did depose and say that he resides at St. James, NY that he is the V.P. of Minelli Construction Co 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.

CAROLE FASANO
Notary Public, State of New York
Qualified in Suffolk County
No. 01FA6194012
Commission Expires May 11, 2015

Carole Fasano
Notary Public

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

ACKNOWLEDGMENT OF PRINCIPAL. IF A N 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 ACKNOWLEDGMENTS AND JUSTIFICATION OF SURETIES

Surety Acknowledgment

State of **New York**

County of **Nassau**

On the 28th day of **March, 2013** personally came **Marnie Ginsburg** to me known , who being by me duly sworn did depose and say that he/she is an Attorney-in-Fact of **Fidelity and Deposit Company of Maryland** in and which executed the above Instrument know(s) the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he/she/they signed the 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 resolution thereof.

TARA LAVERDIERE
Notary Public, State of New York
No. 01LA6076587
Qualified in Nassau County
Commission Expires 6/24/2014

My commission expires

Notary Public

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **THOMAS O. MCCLELLEN, Vice President,** in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Louis J. SPINA, Denese THOMPSON, Philip G. SAMUEL, Frank ABBATIELLO, Kim SPINELLO, Tara LAVERDIERE and Marnie GINSBURG, all of Garden City, New York, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 9th day of May, A.D. 2012.

ATTEST:

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: _____
Assistant Secretary
Eric D. Barnes

_____
Vice President
Thomas O. McClellen

State of Maryland
City of Baltimore

On this 9th day of May, A.D. 2012, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **THOMAS O. MCCLELLEN, Vice President, and ERIC D. BARNES, Assistant Secretary,** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

_____
Constance A. Dunn, Notary Public
My Commission Expires: July 14, 2015

FIDELITY AND DEPOSIT COMPANY

OF MARYLAND
600 Red Brook Blvd., Suite 600, Owings Mills, MD 21117

Statement of Financial Condition
As Of December 31, 2011

ASSETS

Bonds		$ 167,477,539
Stocks		23,576,974
Cash and Short Term Investments		235,580
Reinsurance Recoverable		12,886,175
Other Accounts Receivable		39,980,988
TOTAL ADMITTED ASSETS		$ 244,157,256

LIABILITIES, SURPLUS AND OTHER FUNDS

Reserve for Taxes and Expenses		$ 127,987
Ceded Reinsurance Premiums Payable		48,215,682
Securities Lending Collateral Liability		1,022,500
TOTAL LIABILITIES		$ 49,366,169
Capital Stock, Paid Up	$ 5,000,000	
Surplus	189,791,087	
Surplus as regards Policyholders		194,791,087
TOTAL		$ 244,157,256

Securities carried at $59,049,993 in the above statement are deposited as required by law.

Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of December 31, 2011 market quotations for all bonds and stocks owned, the Company's total admitted assets would be $253,778,028 and surplus as regards policyholders $204,411,859.

I, DENNIS F. KERRIGAN, Corporate Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2011.

Corporate Secretary

State of Illinois
City of Schaumburg } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Illinois, in the City of Schaumburg, this 15th day of March, 2012.

Notary Public

OFFICIAL SEAL
DARRYL JOINER
Notary Public - State of Illinois
My Commission Expires May 3, 2014

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

ESTIMATING C.D.V. UNIT
2013 MAY 28 P 1:33

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
CONTRACT 1 - GENERAL CONSTRUCTION WORK								
010000	***GENERAL REQUIREMENTS***							
	Mobilization		ls	11,060	14,000.00	16,590	21,000	35,000.00
	Site survey of material delivery and work conditions							
	Delivery of on site equipment and tools							
	Set up of material storage areas and security of materials							
	Plan for security of materials							
	Demobilization		ls	11,060	14,000.00	16,590	21,000	35,000.00
	Removal of on site equipment and tools							
	Removal of storage areas							
	Subcontractor cleanup of storage areas							
	Phasing		ls	3,160	4,000.00	4,740	6,000	10,000.00
	Temporary close off wall including removal and disposal	125.0	sf	3,160	4,000.00	4,740	6,000	10,000.00
	Temporary facilities		ls	3,792	4,800.00	5,688	7,200	12,000.00
	Sub total			32,232	40,800.00	48,348	61,200	102,000.00
013329	**LEED Submittals**		ls	4,740	6,000.00	7,110	9,000	15,000.00
017419	**Construction Waste Management**		ls	316	400.00	474	600	1,000.00
018113	**LEED Requirements**		ls	316	400.00	474	600	1,000.00
018116	**Environmental Practices**		ls	316	400.00	474	600	1,000.00
018119	**Construction IAQ Management**		ls	316	400.00	474	600	1,000.00
018419	**VOC Limits for Adhesives, Sealants and Architectural Coatings**		ls	316	400.00	474	600	1,000.00
019113	**General Commissioning Requirements**		ls	1,580	2,000.00	2,370	3,000	5,000.00
	Sub total			7,900	10,000.00	11,850	15,000	25,000.00
020000	***EXISTING CONDITIONS***							
024116	**Building Demolition**							
	Building	2,880.0	sf	20,698	26,200.00	31,047	39,300	65,500.00
	Sub total			20,698	26,200.00	31,047	39,300	65,500.00
024119	**Selective Demolition and Alteration Work**							
	Demolition							
	Site							

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Site clearing							
	Clearing, including removal of vegetation, brush and shrubs and miscellaneous other structures, uon	13,600.0	sf	2,528	3,200.00	3,792	4,800	8,000.00
	Tree removal							
	Street	6.0	each	695	880.00	1,043	1,320	2,200.00
	Site	5.0	each	537	680.00	806	1,020	1,700.00
	Sidewalk	400.0	sf	363	460.00	545	690	1,150.00
	Curb	1,200.0	lf	569	720.00	853	1,080	1,800.00
	Pavement	560.0	sf	1,232	1,560.00	1,849	2,340	3,900.00
	Cage/storage areas pads/paving	360.0	sf	569	720.00	853	1,080	1,800.00
	Site improvements							
	Fences	225.0	lf	363	460.00	545	690	1,150.00
	Gates	4.0	pair	126	160.00	190	240	400.00
	Signs	1.0	each	24	30.00	36	45	75.00
	Plumbing							
	Sewer and vent	3.0	ls	442	560.00	664	840	1,400.00
	Drywell rings	3.0	each	379	480.00	569	720	1,200.00
	Septic tank	1.0	each	126	160.00	190	240	400.00
	Leaching field	3.0	each	379	480.00	569	720	1,200.00
	Electrical							
	Disconnect and make safe		ls	1,264	1,600.00	1,896	2,400	4,000.00
	Foundations							
	Footings	280.0	lf	3,160	4,000.00	4,740	6,000	10,000.00
	Grade wall	460.0	sf	3,002	3,800.00	4,503	5,700	9,500.00
	Water sprinkling		days	1,422	1,800.00	2,133	2,700	4,500.00
	Perimeter air monitoring, including meteorological station, uon		ls	1,422	1,800.00	2,133	2,700	4,500.00
	Regrade	13,600.0	sf	1,422	1,800.00	2,133	2,700	4,500.00
	Equipment							
	Storage sheds for relocation	2.0	each	695	880.00	1,043	1,320	2,200.00
	Sub total			20,722	26,230.00	31,083	39,345	65,575.00
28213	Asbestos Abatement							
			ls	17,380	22,000.00	26,070	33,000	55,000.00
	Sub total			17,380	22,000.00	26,070	33,000	55,000.00
030000	***CONCRETE [including reinforcing and formwork, unless otherwise noted]***							

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
032400	Fibrous Reinforcing	Included in concrete						
033000	Cast In Place Concrete							
	Pits							
	House trap	6.0	each	4,329	5,480.00	6,494	8,220	13,700.00
	Footings							
	Continuous	60.0	cy	3,160	4,000.00	4,740	6,000	10,000.00
	Exterior screen wall	22.0	cy	3,792	4,800.00	5,688	7,200	12,000.00
	Column	18.0	cy	3,476	4,400.00	5,214	6,600	11,000.00
	Piers	12.0	each	2,844	3,600.00	4,266	5,400	9,000.00
	Foundation grade wall							
	0.7	24.0	cy	1,201	1,520.00	1,801	2,280	3,800.00
	1.0	24.0	cy	1,327	1,680.00	1,991	2,520	4,200.00
	Light pole	6.0	cy	474	600.00	711	900	1,500.00
	Sub total			20,603	26,080.00	30,905	39,120	65,200.00
035300	Concrete Floor Topping							
	Unframed	20.0	cy	11,060	14,000.00	16,590	21,000	35,000.00
	Loading dock, complete	4,864.0	sf	8,216	10,400.00	12,324	15,600	26,000.00
	Slab above grade							
	Framed	4,864.0	cy	4,424	5,600.00	6,636	8,400	14,000.00
	Troughs	180.0	lf	3,950	5,000.00	5,925	7,500	12,500.00
	Curbs, slab elevations and depressions		ls	4,424	5,600.00	6,636	8,400	14,000.00
	Sub total			32,074	40,600.00	48,111	60,900	101,500.00
040000	*MASONRY AND STONE*							
042000	Unit Masonry							
	Walls							
A	8" GFCMU		sf	7,584	9,600.00	11,376	14,400	24,000.00
B	4" GFCMU with 4" CMU (with clerestory)		sf	11,376	14,400.00	17,064	21,600	36,000.00
B1	4" GFCMU with 4" CMU		sf	8,848	11,200.00	13,272	16,800	28,000.00
C/C1	4" GFCMU with CMU (and 4" insulation sandwich)		sf	11,692	14,800.00	17,538	22,200	37,000.00
D	Double 4" CMU (with 4" insulation sandwich)		sf	12,640	16,000.00	18,960	24,000	40,000.00
	Partitions							
E	4" CMU		sf	9,875	12,500.00	14,813	18,750	31,250.00
E1	4" CMU		sf	8,848	11,200.00	13,272	16,800	28,000.00
F	6" CMU		sf	6,036	7,640.00	9,053	11,460	19,100.00
F1	6" CMU		sf	7,110	9,000.00	10,665	13,500	22,500.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

			Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	F2	6" CMU (with clerestory)		sf	11,376	14,400.00	17,064	21,600	36,000.00
	G	8" CMU		sf	10,428	13,200.00	15,642	19,800	33,000.00
	G1	8" CMU		sf	10,428	13,200.00	15,642	19,800	33,000.00
	G2	6" CMU (with clerestory)		sf	8,532	10,800.00	12,798	16,200	27,000.00
		Infill at interior grille locations for insulated louvers (add alternate)		sf	11,060	14,000.00	16,590	21,000	35,000.00
		Scaffolding/work platforms		ls					
		Roof pavers							
		On roofing							
		24" x 24" x 2" rubber pad		sf	5,214	6,600.00	7,821	9,900	16,500.00
		Sub total			141,047	178,540.00	211,570	267,810	446,350.00
050000	***METALS***								
051200	**Structural Steel**								
		Posts	2,758.0	lbs	7,584	9,600.00	11,376	14,400	24,000.00
		Beams and girders	1,800.0	lbs	26,860	34,000.00	40,290	51,000	85,000.00
		Channels	*575.0*	lbs	11,692	14,800.00	17,538	22,200	37,000.00
		Angles	*500.0*	lbs	5,214	6,600.00	7,821	9,900	16,500.00
		Plates	*2,205.0*	lbs	4,045	5,120.00	6,067	7,680	12,800.00
		Girts	29,644.0	lbs	8,216	10,400.00	12,324	15,600	26,000.00
		HSS	952.0	lbs	6,004	7,600.00	9,006	11,400	19,000.00
		Angles, connections and plates	700.0	lbs	7,268	9,200.00	10,902	13,800	23,000.00
		Deck bridging	880.0	lf	7,584	9,600.00	11,376	14,400	24,000.00
		Cross bridging	225.0	lf	5,214	6,600.00	7,821	9,900	16,500.00
		Diagonal bracing	110.0	lf	5,846	7,400.00	8,769	11,100	18,500.00
		Perimeter angles							
		3x3x1/4	110.0	lf	4,740	6,000.00	7,110	9,000	15,000.00
		4x4x1/4	48.0	lf	4,424	5,600.00	6,636	8,400	14,000.00
		4x4x3/8	48.0	lf	5,372	6,800.00	8,058	10,200	17,000.00
		6x6x5/16	64.0	lf	6,636	8,400.00	9,954	12,600	21,000.00
		Joist space angles							
		3x3x1/4, welded to joist and steel deck	110.0	lf	6,952	8,800.00	10,428	13,200	22,000.00
		Sub total			123,651	156,520.00	185,476	234,780	391,300.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
053000	**Metal Decking**							
	1 1/2" acoustical deck	2,205.0	sf	13,588	17,200.00	20,382	25,800	43,000.00
	Edge stop	575.0	lf	2,528	3,200.00	3,792	4,800	8,000.00
	Sub total			16,116	20,400.00	24,174	30,600	51,000.00
054000	**Cold Formed Metal Framing**							
	Lintels							
	L 5 x 3 1/2 x 5/16"	90.0	lf	1,580	2,000.00	2,370	3,000	5,000.00
	L 6 x 3 1/2 x 5/16"	90.0	lf	1,580	2,000.00	2,370	3,000	5,000.00
	Joists							
	CF	68.0	lf	1,517	1,920.00	2,275	2,880	4,800.00
	Sub total			4,677	5,920.00	7,015	8,880	14,800.00
055000	**Miscellaneous Metals**							
	Canopy trim	575.0	lf	4,740	6,000.00	7,110	9,000	15,000.00
	Trough cover plate	180.0	lf	2,844	3,600.00	4,266	5,400	9,000.00
	Thresholds							
	Double	8.0	each	5,688	7,200.00	8,532	10,800	18,000.00
	Single	8.0	each	5,688	7,200.00	8,532	10,800	18,000.00
	Cattery							
	Floor	480.0	sf	4,266	5,400.00	6,399	8,100	13,500.00
	Porthole wall	28.0	sf	3,792	4,800.00	5,688	7,200	12,000.00
	Insulated ceiling	1,200.0	sf	8,216	10,400.00	12,324	15,600	26,000.00
	Meet & greet window							
	Insulated surround	240.0	sf	4,424	5,600.00	6,636	8,400	14,000.00
	Metal stairs		lfr	5,688	7,200.00	8,532	10,800	18,000.00
	Sheet metal fabrications							
	Coping	328.0	lf	4,266	5,400.00	6,399	8,100	13,500.00
	Loading dock canopy	144.0	sf	3,097	3,920.00	4,645	5,880	9,800.00
	Bearing plates and connectors, loose lintels and miscellaneous anchorage devices		ls	2,844	3,600.00	4,266	5,400	9,000.00
	Miscellaneous metals including partition and ceiling supports, door lintels, shelf angles, motor supports, door supports		ls	5,372	6,800.00	8,058	10,200	17,000.00
	Sub total			60,925	77,120.00	91,387	115,680	192,800.00
060000	***WOOD, PLASTICS & COMPOSITES***							
062000	**Carpentry**							

Project: Staten Island Animal Care and Control Center
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Bidder: _____

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Formwork							
	Roof decking, 3/4" plywood		sf	4,740	6,000.00	7,110	9,000	15,000.00
	Electrical, data and telephone backboards		sf	3,002	3,800.00	4,503	5,700	9,500.00
	Sub total			7,742	9,800.00	11,613	14,700	24,500.00
062023	**Cabinetry and Millwork**							
	Reception desk	7.4	lf	20,540	26,000.00	30,810	39,000	65,000.00
	Cabinets							
	Base cabinet							
	Kitchen unit	14.0	lf	8,848	11,200.00	13,272	16,800	28,000.00
	Veterinary remove and reinstall	22.0	lf	9,480	12,000.00	14,220	18,000	30,000.00
	Wall upper cabinet							
	Kitchen unit	24.0	lf	3,950	5,000.00	5,925	7,500	12,500.00
	Food prep	14.0	lf	4,898	6,200.00	7,347	9,300	15,500.00
	Surgery remove and reinstall	14.0	lf	4,898	6,200.00	7,347	9,300	15,500.00
	Veterinary remove and reinstall	14.0	lf	3,950	5,000.00	5,925	7,500	12,500.00
	Counters							
	Manager, office, lunch	7.0	lf	6,952	8,800.00	10,428	13,200	22,000.00
	Blocking/anchor to partition or wall	7.0	lf	3,002	3,800.00	4,503	5,700	9,500.00
	Rough carpentry		ls	1,580	2,000.00	2,370	3,000	5,000.00
	Sub total			68,098	86,200.00	102,147	129,300	215,500.00
070000	***MOISTURE THERMAL SOUND FIRE CONTROL***							
071326	**Sheet Membrane Waterproofing**							
	Storage and utility area	384.0	sf	5,688	7,200.00	8,532	10,800	18,000.00
	Foundation wall	1,680.0	sf	6,952	8,800.00	10,428	13,200	22,000.00
	Sub total			12,640	16,000.00	18,960	24,000	40,000.00
072100	**Thermal Insulation**							
	Foundation	1,680.0	sf	6,004	7,600.00	9,006	11,400	19,000.00
	Slab	4,864.0	sf	4,424	5,600.00	6,636	8,400	14,000.00
	Wall	1,024.0	sf	4,424	5,600.00	6,636	8,400	14,000.00
	Roof	4,864.0	sf	7,268	9,200.00	10,902	13,800	23,000.00
	Sub total			22,120	28,000.00	33,180	42,000	70,000.00
072616	**Below-Slab Vapor Retarder**							
	Horizontal							
	On grade	4,864.0	sf	3,002	3,800.00	4,503	5,700	9,500.00

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CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Sub total			3,002	3,800.00	4,503	5,700	9,500.00
072700	**Air and Vapor Barrier Membrane**							
	Vertical							
	Exterior cmu	2,240.0	sf	2,528	3,200.00	3,792	4,800	8,000.00
	Sub total			2,528	3,200.00	3,792	4,800	8,000.00
074196	**Polycarbonate Exterior Panels**							
	Outside perimeter	3,360.0	sf	11,060	14,000.00	16,590	21,000	35,000.00
	Inside clerestory	720.0	sf	11,060	14,000.00	16,590	21,000	35,000.00
	Sub total			22,120	28,000.00	33,180	42,000	70,000.00
074223	**Preformed Wood Exterior Ceiling Panels**							
	Canopy underside	2,016.0	sf	6,162	7,800.00	9,243	11,700	19,500.00
	Sub total			6,162	7,800.00	9,243	11,700	19,500.00
075200	**Modified Bitumen Roofing**							
	SBS modified bitumin roof, 2 ply, reflective	4,864.0	sf	20,540	26,000.00	30,810	39,000	65,000.00
	Ballast/mechanical attachment	4,864.0	sf	6,320	8,000.00	9,480	12,000	20,000.00
	Sub total			26,860	34,000.00	40,290	51,000	85,000.00
076200	**Sheet Metal Work**							
	Flashing	280.0	lf	2,528	3,200.00	3,792	4,800	8,000.00
	Sub total			2,528	3,200.00	3,792	4,800	8,000.00
077100	**Roof Specialties and Accessories**							
	Roof hatch with ladder	1.0	each	790	1,000.00	1,185	1,500	2,500.00
	Ships ladder	1.0	each	790	1,000.00	1,185	1,500	2,500.00
	Sub total			1,580	2,000.00	2,370	3,000	5,000.00
078413	**Firestops and Smokeseals**	Included in assemblies						
079200	**Joint Sealers**	Included in assemblies						
079500	**Expansion Control**	Included in assemblies						
	miscellaneous caulking and sealing		ls	3,792	4,800.00	5,688	7,200	12,000.00
	Sub total			3,792	4,800.00	5,688	7,200	12,000.00
080000	*OPENINGS*							

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Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

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Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
081113	**Steel Doors and Frames**							
	Exterior							
	Garden wall		each	2,528	3,200.00	3,792	4,800	8,000.00
	Metal		pair	2,370	3,000.00	3,555	4,500	7,500.00
	Sub total			4,898	6,200.00	7,347	9,300	15,500.00
081119	**Stainless Steel Doors and Frames**							
	D Porthole	7.0	each	1,643	2,080.00	2,465	3,120	5,200.00
	E Solid 7' - 4" high	7.0	each	1,517	1,920.00	2,275	2,880	4,800.00
	F Solid 7' - 6" high	7.0	each	1,612	2,040.00	2,417	3,060	5,100.00
	G Porthole with sidelight 4' - 5" wide total	7.0	each	1,612	2,040.00	2,417	3,060	5,100.00
	G1 Porthole with sidelight 4' - 8" wide total	7.0	each	948	1,200.00	1,422	1,800	3,000.00
	Sub total			7,331	9,280.00	10,997	13,920	23,200.00
083113	**Access Doors**							
	Floor		each	2,686	3,400.00	4,029	5,100	8,500.00
	Sub total			2,686	3,400.00	4,029	5,100	8,500.00
083473	**Sound Control Hollow Metal Door Assemblies**							
	Door assemblies		each	6,952	8,800.00	10,428	13,200	22,000.00
	Sub total			6,952	8,800.00	10,428	13,200	22,000.00
084113	**Aluminum Entrances and Storefronts**							
	Entrance/vestibule							
	A Glass/metal	2.0	pair	11,692	14,800.00	17,538	22,200	37,000.00
	Sub total			11,692	14,800.00	17,538	22,200	37,000.00
084228	**All Glass Doors**							
	C Glass with sidelight	2.0	each	30,020	38,000.00	45,030	57,000	95,000.00
	H Glass	2.0	each	2,844	3,600.00	4,266	5,400	9,000.00
	Add for							
	180 swing	4.0	each	2,212	2,800.00	3,318	4,200	7,000.00
	Dual swing	4.0	each	2,765	3,500.00	4,148	5,250	8,750.00
	Electric strike	4.0	each	2,844	3,600.00	4,266	5,400	9,000.00
	Exit device	4.0	each	2,054	2,600.00	3,081	3,900	6,500.00
	Fire rated stainless steel doors at mechanical and electric rooms	8.0	each	2,528	3,200.00	3,792	4,800	8,000.00
	Key box	1.0	each	790	1,000.00	1,185	1,500	2,500.00
	Sub total			46,057	58,300.00	69,086	87,450	145,750.00

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Bidder: _____

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Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
087100	**Door Hardware**	See doors						
088000	**Glass and Glazing**							
	Windows							
	Aluminum window	280.0	sf	12,956	16,400.00	19,434	24,600	41,000.00
	Sidelights	110.0	sf	5,214	6,600.00	7,821	9,900	16,500.00
	Port hole window	12.0	sf	2,844	3,600.00	4,266	5,400	9,000.00
	Storefront	336.0	sf	3,950	5,000.00	5,925	7,500	12,500.00
	Clerestories							
	B (4" CMU with brick facing with) clerestory	280.0	sf	3,160	4,000.00	4,740	6,000	10,000.00
	F2 6" CMU (with clerestory)	340.0	sf	6,636	8,400.00	9,954	12,600	21,000.00
	F3 (6" CMU with) clerestory	280.0	sf	30,968	39,200.00	46,452	58,800	98,000.00
	G2 6" CMU (with clerestory)	280.0	sf	3,792	4,800.00	5,688	7,200	12,000.00
	Interior polycarbonate transom, 3/8" laminated glass, top and bottom spacers, 16mm polycarbonate, add	265.0	sf	3,476	4,400.00	5,214	6,600	11,000.00
	Glass and glazing							
	Cattery	420.0	sf	12,008	15,200.00	18,012	22,800	38,000.00
	Sidelights	120.0	sf	5,530	7,000.00	8,295	10,500	17,500.00
	Surgery	220.0	sf	8,216	10,400.00	12,324	15,600	26,000.00
	Sub total			98,750	125,000.00	148,125	187,500	**312,500.00**
089000	**Louvers and Vents**							
	Aluminum louver							
	Exterior	420.0	sf	7,584	9,600.00	11,376	14,400	24,000.00
	Sub total			7,584	9,600.00	11,376	14,400	**24,000.00**
090000	***FINISHES***							
092900	**Gypsum Drywall**							
	Partitions							
	Fire rated at mechanical room	126.0	sf	26,860	34,000.00	40,290	51,000	85,000.00
	Sub total			26,860	34,000.00	40,290	51,000	**85,000.00**
093000	**Ceramic Tile**							
	Ceramic, unglazed porcelain tile		sf	11,060	14,000.00	16,590	21,000	35,000.00
	Floor							
	Resilient Sheet		sf	13,904	17,600.00	20,856	26,400	44,000.00
	Sealed, polyurethane		sf	16,432	20,800.00	24,648	31,200	52,000.00
	Base							
	Ceramic, unglazed porcelain tile		lf	12,008	15,200.00	18,012	22,800	38,000.00

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Bidder: _____

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Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Sub total			53,404	67,600.00	80,106	101,400	169,000.00
095150	**Wood Composite Ceiling Panels**							
	Wood panel		sf	11,060	14,000.00	16,590	21,000	35,000.00
	Sub total			11,060	14,000.00	16,590	21,000	35,000.00
096723	**Epoxy Resin Composition Flooring and Wall Coverings**							
	Epoxy		sf	13,272	16,800.00	19,908	25,200	42,000.00
	Sub total			13,272	16,800.00	19,908	25,200	42,000.00
09 8433	**Acoustic Wall Panels**							
	Polycarbonate		sf	12,008	15,200.00	18,012	22,800	38,000.00
	Factory finish painted deck	Included in deck						
	Fire rated 1 hour horizontal shaft assembly at electrical and mechanical rooms, painted		sf	14,847	18,794.00	22,271	28,191	46,985.00
	Sub total			26,855	33,994.00	40,283	50,991	84,985.00
099000	**Painting and Finishing**							
	Paint							
	Seal		sf	2,781	3,520.00	4,171	5,280	8,800.00
	Coating at animal areas		sf	1,738	2,200.00	2,607	3,300	5,500.00
	Ceramic, unglazed porcelain tile		sf	2,844	3,600.00	4,266	5,400	9,000.00
	Sub total			7,363	9,320.00	11,044	13,980	23,300.00
100000	***SPECIALTIES***							
101400	**Signage**							
	Jakob webnet							
	Cattery		sf	3,318	4,200.00	4,977	6,300	10,500.00
	Visual display boards							
	Tack		each	348	440.00	521	660	1,100.00
	Traffic/parking							
	Stop		each	664	840.00	995	1,260	2,100.00
	Do not enter		each	442	560.00	664	840	1,400.00
	Handicap parking		each	379	480.00	569	720	1,200.00
	Special parking		each	379	480.00	569	720	1,200.00
	Interior							
	Toilets/mechanical		each	1,959	2,480.00	2,939	3,720	6,200.00
	Room id, custom shaped laser cut aluminum		each	2,844	3,600.00	4,266	5,400	9,000.00

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Directional/restrictional		each	758	960.00	1,138	1,440	2,400.00
	Location		each	758	960.00	1,138	1,440	2,400.00
	Exterior, complete		each	2,726	3,450.00	4,088	5,175	8,625.00
	Sub total			14,576	18,450.00	21,863	27,675	46,125.00
102800	**Toilet accessories**							
	Mirrors with stainless steel frames		each	664	840.00	995	1,260	2,100.00
	Soap dispenser		each	237	300.00	356	450	750.00
	Towel dispenser and disposal unit		each	253	320.00	379	480	800.00
	Sanitary dispenser and disposal unit		each	253	320.00	379	480	800.00
	Toilet tissue dispenser		each	111	140.00	166	210	350.00
	Toilet seat cover dispenser		each	111	140.00	166	210	350.00
	Grab bar		sets	190	240.00	284	360	600.00
	Mop and broom holder and shelving		each	76	96.00	114	144	240.00
	Electric hand dryer		each	253	320.00	379	480	800.00
	Shelf units, 24" uon		each	1,106	1,400.00	1,659	2,100	3,500.00
	Wardrobe & closet specialties							
	Clothes hooks		each	111	140.00	166	210	350.00
	Door hooks		each	111	140.00	166	210	350.00
	Shower accessories		each	111	140.00	166	210	350.00
	Sub total			3,583	4,536.00	5,375	6,804	11,340.00
104416	**Fire Extinguishers and Cabinets**							
	Type A water type		each	1,327	1,680.00	1,991	2,520	4,200.00
	Sub total			1,327	1,680.00	1,991	2,520	4,200.00
105113	**Lockers**							
	Miscellaneous holders, hooks, rods, strips		ls	316	400.00	474	600	1,000.00
	Sub total			316	400.00	474	600	1,000.00
110000	*EQUIPMENT*							
114520	**Stainless Steel Counters and Ledges**							
	Kitchen unit, ss		lf	2,686	3,400.00	4,029	5,100	8,500.00
	Food prep, ss		lf	3,950	5,000.00	5,925	7,500	12,500.00
	Surgery prep, ss		lf	2,686	3,400.00	4,029	5,100	8,500.00
	Surgery remove and install		lf	3,950	5,000.00	5,925	7,500	12,500.00
	Surgery, Veterinary install only (refrigerator)		each	5,056	6,400.00	7,584	9,600	16,000.00
	Veterinary remove and reinstall		lf	885	1,120.00	1,327	1,680	2,800.00
	Sink cuts		each	885	1,120.00	1,327	1,680	2,800.00

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Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Sub total			20,098	25,440.00	30,146	38,160	63,600.00
120000	***FURNISHINGS***							
124814	**Floor Mats and Frames**		ls	664	840.00	995	1,260	2,100.00
	Sub total			664	840.00	995	1,260	2,100.00
130000	***SPECIAL CONSTRUCTION***							
131915	**Animal Cages**		ls	1,106	1,400.00	1,659	2,100	3,500.00
	Sub total			1,106	1,400.00	1,659	2,100	3,500.00
210000	***FIRE SUPRESSION***							
21 0080	**Commissioning of Fire Suppression**		ls	3,160	4,000.00	4,740	6,000	10,000.00
	Sub total			3,160	4,000.00	4,740	6,000	10,000.00
21 1000	**Water Based Fire Suppression System**							
	Equipment							
	Water meter							
	DDCV		each	474	600.00	711	900	1,500.00
	Pumps, vertical in line, uon							
	Fire pump [automatic], _gpm, _psi, _hp							
	Diesel		each	4,424	5,600.00	6,636	8,400	14,000.00
	Fire pump [jockey], _gpm, _psi, _hp (with controller)		each	5,056	6,400.00	7,584	9,600	16,000.00
	Gong		each	1,264	1,600.00	1,896	2,400	4,000.00
	Sprinklers							
	Heads							
	Ordinary hazard, OH-1: 0.15 gal/min/sf; OH-2: 0.20 gal/min/sf		each	5,372	6,800.00	8,058	10,200	17,000.00
	Piping schedule 40 black steel, typical							
	2" and less, schedule 40, uon		lf	3,950	5,000.00	5,925	7,500	12,500.00
	2"+ and greater, schedule 10, uon		lf	2,528	3,200.00	3,792	4,800	8,000.00
	Fittings (clamps, ells, wyes, tees & couplings) and valves		ls	2,370	3,000.00	3,555	4,500	7,500.00
	Floor control assembly		each	664	840.00	995	1,260	2,100.00
	Sprinkler zone valves		each	1,580	2,000.00	2,370	3,000	5,000.00
	Test valve		each	1,106	1,400.00	1,659	2,100	3,500.00
	Rigging, hoisting and scaffolding		ls	4,740	6,000.00	7,110	9,000	15,000.00
	Sub total			33,528	42,440.00	50,291	63,660	106,100.00
220000	***PLUMBING***							
22 0500	**Common Work Results For Plumbing**							

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Service							
	Water							
	Tap		each	1,738	2,200.00	2,607	3,300	5,500.00
	Sanitary/storm							
	Tap		each	2,370	3,000.00	3,555	4,500	7,500.00
	Gas							
	Tap		each	2,939	3,720.00	4,408	5,580	9,300.00
	Equipment							
	ET-1 Expansion tank, 11 gallon		each	190	240.00	284	360	600.00
	Pumps							
	Circulating		each	885	1,120.00	1,327	1,680	2,800.00
	Traps, with frame and cover							
	House -"		each	474	600.00	711	900	1,500.00
	Animal fur/hair interceptor		each	758	960.00	1,138	1,440	2,400.00
	Neutralizing tank		each	569	720.00	853	1,080	1,800.00
	Water meter rig		each	553	700.00	830	1,050	1,750.00
	Sub total			10,475	13,260.00	15,713	19,890	33,150.00
22 0503	**Pipes And Tubes For Plumbing Piping And Equipment**							
	Equipment piping including fittings		ls	758	960.00	1,138	1,440	2,400.00
	Sub total			758	960.00	1,138	1,440	2,400.00
22 0523	**General-Duty Valves For Plumbing Piping**							
	Backflow valves		each	1,264	1,600.00	1,896	2,400	4,000.00
	Sub total			1,264	1,600.00	1,896	2,400	4,000.00
22 0548	**Vibration, Noise Control and Seismic Controls for Plumbing Piping and Equipment**	Included in unit costs						
22 0553	**Plumbing Identification**	Included in unit costs						
22 0700	**Plumbing Insulation**							
	Personnel fixtures [cw/hw, vent, sanitary]		lf	3,792	4,800.00	5,688	7,200	12,000.00
	Sub total			3,792	4,800.00	5,688	7,200	12,000.00
22 0800	**Commissioning of Plumbing**							
	System sterilization and purity test		ls	2,054	2,600.00	3,081	3,900	6,500.00
	Sub total			2,054	2,600.00	3,081	3,900	6,500.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
22 1100	**Facility Water Distribution**	See fixture piping						
22 1300	**Facility Sanitary Sewerage**	See fixture piping						
22 1400	**Facility Storm Drainage**							
	Fixture piping: domestic water, type l; sanitary waste, ci no hub; storm, ci single hub, uon							
	Personnel fixtures [cw/hw, vent, sanitary]		lf	1,454	1,840.00	2,180	2,760	4,600.00
	House fixtures [cw, vent, storm]		lf	2,054	2,600.00	3,081	3,900	6,500.00
	Metal gutter		lf	1,201	1,520.00	1,801	2,280	3,800.00
	Integral metal gutter		lf	4,045	5,120.00	6,067	7,680	12,800.00
	Downspout		each	3,160	4,000.00	4,740	6,000	10,000.00
	Underground piping		lf	4,329	5,480.00	6,494	8,220	13,700.00
	Fittings (clamps, ells, wyes, tees & couplings) and valves		ls	3,792	4,800.00	5,688	7,200	12,000.00
	Joints							
	Personnel fixtures [cw/hw, vent, sanitary]							
	Couplings		each	4,013	5,080.00	6,020	7,620	12,700.00
	Elbows		each	4,013	5,080.00	6,020	7,620	12,700.00
	Tees		each	4,013	5,080.00	6,020	7,620	12,700.00
	House fixtures [cw, vent, storm]							
	Couplings		each	4,108	5,200.00	6,162	7,800	13,000.00
	Elbows		each	3,792	4,800.00	5,688	7,200	12,000.00
	Tees		each	3,697	4,680.00	5,546	7,020	11,700.00
	Sub total			43,671	55,280.00	65,507	82,920	138,200.00
22 3400	**Fuel-Fired Domestic Water Heaters**							
	Hw tank							
	GWH-1 100 gallon storage, 171 gph recovery		each	3,855	4,880.00	5,783	7,320	12,200.00
	Sub total			3,855	4,880.00	5,783	7,320	12,200.00
22 4000	**Plumbing Fixtures**							
	Including rough in							
	Lavatories, including faucets and waste fittings							
	Wall		each	4,740	6,000.00	7,110	9,000	15,000.00
	Sinks, including faucets and waste fittings							
	Counter							
	Surgery prep		each	4,108	5,200.00	6,162	7,800	13,000.00
	Exam		each	4,013	5,080.00	6,020	7,620	12,700.00
	Food prep/lunch		each	4,266	5,400.00	6,399	8,100	13,500.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Wall							
	Recovery/isolation/holding		each	2,686	3,400.00	4,029	5,100	8,500.00
	Janitor/storage		each	664	840.00	995	1,260	2,100.00
	Ewc, dual		each	4,266	5,400.00	6,399	8,100	13,500.00
	Shower, including head and valve		each	569	720.00	853	1,080	1,800.00
	Water closets, floor mounted, dual flush, uon							
	Handicap		each	521	660.00	782	990	1,650.00
	Capped and refrigerator outlets		each	822	1,040.00	1,232	1,560	2,600.00
	Washer connections		each	1,580	2,000.00	2,370	3,000	5,000.00
	Hose bibs, hot and cold water							
	Non freeze		each	2,525	3,195.60	3,787	4,793	7,989.00
	Interior		each	2,525	3,195.60	3,787	4,793	7,989.00
	Drains							
	Site	41.0	each	8,013	10,143.60	12,020	15,215	25,359.00
	Floor							
	3"		each	5,214	6,600.00	7,821	9,900	16,500.00
	4"		each	5,214	6,600.00	7,821	9,900	16,500.00
	Shower		each	5,214	6,600.00	7,821	9,900	16,500.00
	Roof , drains and overflow drains		each	5,214	6,600.00	7,821	9,900	16,500.00
	Gas equipment and piping							
	Meter	Supplied by utility com						
	Meter rig		each					
	Gas piping	All included						
	Mains		lf	12,640	16,000.00	18,960	24,000	40,000.00
	Distribution		lf	7,584	9,600.00	11,376	14,400	24,000.00
	Fittings and valves		ls	17,380	22,000.00	26,070	33,000	55,000.00
	Gas flue		lf	4,550	5,760.00	6,826	8,640	14,400.00
	Pumps, gages, meters, thermometers		ls					
	Rigging, hoisting and scaffolding		ls					
	Sub total			104,307	132,034.80	156,461	198,052	330,087.00
230000	*HVAC*							
23 0500	**Basic Mechanical Requirements**	Included in units						
23 0503	**Pipe And Fittings**	Included in units						
23 0513	**Motors**	Included in units						
23 0514	**Motors Starters And Wiring**	See electrical						
23 0529	**Supports And Anchors**							

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Supports							
	Prefab curb		lf	1,738	2,200.00	2,607	3,300	5,500.00
	Sub total			1,738	2,200.00	2,607	3,300	5,500.00
23 0548	**Vibration Isolation And Seismic Restraints**	Included in units						
23 0553	**Mechanical Identification**	Included in units						
23 0593	**Testing, Adjusting & Balancing (Tab) Of Mechanical Systems**							
	BMS contols							
	Equipment							
	Branch circuit controller, 8 zones		each	4,740	6,000.00	7,110	9,000	15,000.00
	Central system control							
	I/O points							
	Roof top units		each	20,540	26,000.00	30,810	39,000	65,000.00
	Split unit, condenser sections		each	7,900	10,000.00	11,850	15,000	25,000.00
	Emergency generator		each	7,900	10,000.00	11,850	15,000	25,000.00
	Conduit and wire							
	Conduit		lf	3,160	4,000.00	4,740	6,000	10,000.00
	Wire		lf	2,212	2,800.00	3,318	4,200	7,000.00
	Terminal equipment control							
	Split unit, evaporator sections		each	2,844	3,600.00	4,266	5,400	9,000.00
	Exhaust fans		each	3,792	4,800.00	5,688	7,200	12,000.00
	Unit heaters		each	3,002	3,800.00	4,503	5,700	9,500.00
	Room humidity		each	774	980.00	1,161	1,470	2,450.00
	Conduit and wire							
	Conduit		lf	4,424	5,600.00	6,636	8,400	14,000.00
	Wire		lf	7,900	10,000.00	11,850	15,000	25,000.00
	Rigging, hoisting and scaffolding		ls	2,844	3,600.00	4,266	5,400	9,000.00
	Balancing							
	Roof top units		each	1,660	2,100.80	2,489	3,151	5,252.00
	Condenser sections		each	1,201	1,520.00	1,801	2,280	3,800.00
	Evaporator sections		each	1,580	2,000.00	2,370	3,000	5,000.00
	Fans		each	2,212	2,800.00	3,318	4,200	7,000.00
	Hydronic piping		lot	3,634	4,600.00	5,451	6,900	11,500.00
	Water system		lot	3,634	4,600.00	5,451	6,900	11,500.00
	Registers & grilles		each	3,002	3,800.00	4,503	5,700	9,500.00
	Sub total			88,955	112,600.80	133,432	168,901	281,502.00
23 0700	**Mechanical Insulation**	Included in units						

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
23 0800	**Commissioning of Mechanical Systems**							
	Code compliance test		ls	1,580	2,000.00	2,370	3,000	5,000.00
	Sub total			1,580	2,000.00	2,370	3,000	5,000.00
23 2300	**Refrigerant Piping**	Included in units						
23 3000	**Ductwork And Accessories**							
	Distribution							
	Supply and return							
	Ductwork rectangular and circular, galvanized, uon		pounds	3,918	4,960.00	5,878	7,440	12,400.00
	Fittings		pounds	2,686	3,400.00	4,029	5,100	8,500.00
	6" gooseneck		each	1,422	1,800.00	2,133	2,700	4,500.00
	Sub total			8,026	10,160.00	12,040	15,240	25,400.00
23 3400	**Fans**							
	Exhaust fans							
	F-1 400		each	2,212	2,800.00	3,318	4,200	7,000.00
	F-2 200		each	2,844	3,600.00	4,266	5,400	9,000.00
	F-3 100		each	1,896	2,400.00	2,844	3,600	6,000.00
	F-4 580		each	2,370	3,000.00	3,555	4,500	7,500.00
	Sub total			9,322	11,800.00	13,983	17,700	29,500.00
23 3700	**Air Outlets And Inlets**							
	Registers and diffusers:							
	LG-1 Spiral duct linear grille, extractor		each	2,528	3,200.00	3,792	4,800	8,000.00
	CG-1 Square diffuser		each	2,528	3,200.00	3,792	4,800	8,000.00
	RG-1 Filtered return grille, 2" merv filter		each	2,275	2,880.00	3,413	4,320	7,200.00
	RG-2 Filtered return grille, 2" merv filter		each	1,991	2,520.00	2,986	3,780	6,300.00
	WG-1 Round supply grille		each	2,528	3,200.00	3,792	4,800	8,000.00
	WG-2 Supply grille		each	1,738	2,200.00	2,607	3,300	5,500.00
	EG-1, 2 Exhaust grille		each	2,275	2,880.00	3,413	4,320	7,200.00
	LFD-1 Laminar flow hepa supply diffuser, integral hepa filter		each	1,896	2,400.00	2,844	3,600	6,000.00
	LFD-2 Laminar flow hepa supply diffuser, integral hepa filter		each	2,686	3,400.00	4,029	5,100	8,500.00
	UFD-1 Linear floor grille		each	1,738	2,200.00	2,607	3,300	5,500.00
	Acoustical transfer louvers		each	1,422	1,800.00	2,133	2,700	4,500.00
	Louvers with wms, 1sf		each	1,422	1,800.00	2,133	2,700	4,500.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Dampers at grilles		each	2,844	3,600.00	4,266	5,400	9,000.00
	Sub total			27,871	35,280.00	41,807	52,920	88,200.00
23 4100	**Particulate Air Filtration**	Included in units						
23 7432	**Packaged Rooftop Units**							
	Roof top units							
	RTU-1 6,000 cfm dx		each	20,951	26,520.00	31,426	39,780	66,300.00
	RTU-1- 3,000 cfm dx		each	19,213	24,320.00	28,819	36,480	60,800.00
	RTU-3 3,500 cfm dx		each	20,951	26,520.00	31,426	39,780	66,300.00
	Crane		ls	2,844	3,600.00	4,266	5,400	9,000.00
	Electric connections		ls	3,792	4,800.00	5,688	7,200	12,000.00
	Natural gas, piping connections		ls	4,740	6,000.00	7,110	9,000	15,000.00
	Sub total			72,490	91,760.00	108,736	137,640	229,400.00
23 7435	**Surgery Room Air Conditioning Unit**	See Roof top units						
23 8126	**Variable Refrigerant Flow Zoning Split System**							
	Split system							
	Condenser sections, rooftop							
	ACC-1		each	2,686	3,400.00	4,029	5,100	8,500.00
	ACC-2		each	2,686	3,400.00	4,029	5,100	8,500.00
	Evaporator sections, interior							
	AC-2, 3, 4		each	1,359	1,720.00	2,038	2,580	4,300.00
	AC-1, 5 , 6		each	1,106	1,400.00	1,659	2,100	3,500.00
	AC-7		each	2,275	2,880.00	3,413	4,320	7,200.00
	Crane		ls	885	1,120.00	1,327	1,680	2,800.00
	Electric connections		ls	1,201	1,520.00	1,801	2,280	3,800.00
	Piping connections		ls	506	640.00	758	960	1,600.00
	Sub total			12,703	16,080.00	19,055	24,120	40,200.00
23 8200	**Heating Terminal Units**	See electrical						
23 8220	**Air Curtains**	Included in units						
260000	***ELECTRICAL***							

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
260500	**Common Work Results for Electrical**							
	Service							
	Electrical							
	Tap		each	1,580	2,000.00	2,370	3,000	5,000.00
	Telephone							
	Tap		each	1,580	2,000.00	2,370	3,000	5,000.00
	Equipment							
	Emergency generator							
	Reuse existing		each	4,740	6,000.00	7,110	9,000	15,000.00
	Electric unit heaters							
	UH-1 - 3, CH-1 14.4amp		each	5,372	6,800.00	8,058	10,200	17,000.00
	UH-4 36amp		each	5,372	6,800.00	8,058	10,200	17,000.00
	FPT-1 3kw		each	5,372	6,800.00	8,058	10,200	17,000.00
	Sub total			24,016	30,400.00	36,024	45,600	76,000.00
260519	**Low Voltage Electrical Power Conductors and Cables**							
	Feeders							
	Air cleaning							
	Electric air cleaner		each	2,686	3,400.00	4,029	5,100	8,500.00
	2 - (3)350kcmil+(1)350kcmil +#1awg g, 3" conduit, ug		lf	2,212	2,800.00	3,318	4,200	7,000.00
	2 - (3)350kcmil+(1)350kcmil +#1awg g, 3" conduit		lf	2,212	2,800.00	3,318	4,200	7,000.00
	4#1+1#6g, 2" c, ug		lf	2,686	3,400.00	4,029	5,100	8,500.00
	4#3+1#6g, 2" c		lf	3,002	3,800.00	4,503	5,700	9,500.00
	4#4/0+1#1g, 2 1/2" c		lf	3,002	3,800.00	4,503	5,700	9,500.00
	3#2+1#6g, 1 1/22" c		lf	2,654	3,360.00	3,982	5,040	8,400.00
	4#1+1#6g, 1 1/2" c		lf	2,402	3,040.00	3,602	4,560	7,600.00
	2#8 +3/4" c		lf	2,654	3,360.00	3,982	5,040	8,400.00
	General		ls	790	1,000.00	1,185	1,500	2,500.00
	Gutter		lf	790	1,000.00	1,185	1,500	2,500.00
	Ice melt pads		sf	2,402	3,040.00	3,602	4,560	7,600.00
	Sub total			27,492	34,800.00	41,238	52,200	87,000.00
260526	**Grounding and Bonding for Electrical Systems**	See systems						
260529	**Hangers and Supports for Electrical Systems**	See systems						
260533	**Raceway and Boxes for Electrical Systems**	See systems						
260548	**Vibration and Seismic Control for Electrical Systems**	See systems						
260553	**Identification for Electrical Systems**	See systems						

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
			ls	1,580	2,000.00	2,370	3,000	5,000.00
260800	**Commissioning of Electrical**							
	Sub total			1,580	2,000.00	2,370	3,000	5,000.00
260923	**Lighting Control Devices**							
	Branch Circuit							
	Switches		each	8,532	10,800.00	12,798	16,200	27,000.00
	Occupancy sensor with switch							
	Wall mounted		each	6,004	7,600.00	9,006	11,400	19,000.00
	Photocell controller		each	3,950	5,000.00	5,925	7,500	12,500.00
	Sub total			18,486	23,400.00	27,729	35,100	58,500.00
262200	**Low Voltage Transformers**							
	Transformer		each	632	800.00	948	1,200	2,000.00
	Sub total			632	800.00	948	1,200	2,000.00
262416	**Panelboards**							
	Panels							
	Main distribution panel, 600a		each	6,952	8,800.00	10,428	13,200	22,000.00
	Lighting/power, 225a each		each	7,584	9,600.00	11,376	14,400	24,000.00
	Sub total			14,536	18,400.00	21,804	27,600	46,000.00
262417	**Selection of Overcurrent Devices**	See systems						
262500	**Roof Snow Melting System**	See systems						
262713	**Electricity Metering**							
	Electric meter rig		each	3,002	3,800.00	4,503	5,700	9,500.00
	Sub total			3,002	3,800.00	4,503	5,700	9,500.00
262726	**Wiring Devices**							
	Receptacles							
	Simplex GFI weatherproof		each	2,844	3,600.00	4,266	5,400	9,000.00
	Duplex		each	2,686	3,400.00	4,029	5,100	8,500.00
	Duplex GFI		each	2,781	3,520.00	4,171	5,280	8,800.00
	Duplex GFI weatherproof		each	2,528	3,200.00	3,792	4,800	8,000.00
	Quad		each	2,054	2,600.00	3,081	3,900	6,500.00
	Floor mounted quad GFI weatherproof		each	853	1,080.00	1,280	1,620	2,700.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

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Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Astronomical clock for outdoor lighting		each	1,201	1,520.00	1,801	2,280	3,800.00
	Kitchen connections	See conduit and wire						
	Raceway with outlets		lf	4,266	5,400.00	6,399	8,100	13,500.00
	Backboxes		each	8,216	10,400.00	12,324	15,600	26,000.00
	Branch circuit conduit and wire							
	Conduit assorted, including elbows, connectors, couplings and straps		lf	5,846	7,400.00	8,769	11,100	18,500.00
	Wire assorted		lf	5,688	7,200.00	8,532	10,800	18,000.00
	Junction boxes		each	4,424	5,600.00	6,636	8,400	14,000.00
	Grounding		ls	3,950	5,000.00	5,925	7,500	12,500.00
	Junction box for actuators for operable louvers		each	2,022	2,560.00	3,034	3,840	6,400.00
	Junction box		each	1,991	2,520.00	2,986	3,780	6,300.00
	Motor connections		each	1,485	1,880.00	2,228	2,820	4,700.00
	Sub total			52,835	66,880.00	79,253	100,320	167,200.00
262813	**Fuses**							
	Fco		each	1,580	2,000.00	2,370	3,000	5,000.00
	Sub total			1,580	2,000.00	2,370	3,000	5,000.00
262816	**Enclosed Switches**							
	Combination starter and fused disconnect switch, waterproof		each	1,580	2,000.00	2,370	3,000	5,000.00
	Sub total			1,580	2,000.00	2,370	3,000	5,000.00
263600	**Automatic Transfer Switches**							
	Service disconnect switch, 600a		each	4,266	5,400.00	6,399	8,100	13,500.00
	Transfer switch ats							
	30amp		each	632	800.00	948	1,200	2,000.00
	200amp		each	885	1,120.00	1,327	1,680	2,800.00
	Sub total			5,783	7,320.00	8,674	10,980	18,300.00
265000	**Architectural Lighting**							
	Lighting fixtures							
	Interior Cellar		each	2,149	2,720.00	3,223	4,080	6,800.00
	Exit							
	Wall		each	1,580	2,000.00	2,370	3,000	5,000.00
	Ceiling		each	3,160	4,000.00	4,740	6,000	10,000.00
	Ceiling double sided		each	2,686	3,400.00	4,029	5,100	8,500.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
L1	Cable mounted switched and dimmeable T8 linear fluorescent direct/indirect pendant,3 lamp		each	8,848	11,200.00	13,272	16,800	28,000.00
L1A	"		each	9,164	11,600.00	13,746	17,400	29,000.00
L1B	"		each	9,164	11,600.00	13,746	17,400	29,000.00
L1C	"		each	2,212	2,800.00	3,318	4,200	7,000.00
L1E	"		each	2,212	2,800.00	3,318	4,200	7,000.00
L1F	"		each	2,212	2,800.00	3,318	4,200	7,000.00
L1G	"		each	2,212	2,800.00	3,318	4,200	7,000.00
L1H	"		each	2,212	2,800.00	3,318	4,200	7,000.00
L2	Cable mounted fluorescent direct/indirect pendant,1 lamp		each	1,201	1,520.00	1,801	2,280	3,800.00
L3	Cable mounted fluorescent direct/indirect pendant,2 lamp		each	1,517	1,920.00	2,275	2,880	4,800.00
L3A	"		each	1,517	1,920.00	2,275	2,880	4,800.00
L4	Cable mountedfluorescent direct/indirect pendant,4 lamp		each	1,517	1,920.00	2,275	2,880	4,800.00
L4A	"		each	1,517	1,920.00	2,275	2,880	4,800.00
L5	Cable mounted fluorescent sealed pendant,2 lamp		each	1,770	2,240.00	2,654	3,360	5,600.00
L6	Surface mounted fluorescent vanity light		each	790	1,000.00	1,185	1,500	2,500.00
L7	Recessed exterior rated downlight		each	474	600.00	711	900	1,500.00
L8	Standalone led adjustable desk lamp		each	885	1,120.00	1,327	1,680	2,800.00
L9	Surface mounted linear undercabinet		each	569	720.00	853	1,080	1,800.00
EM	Emergency battery pack with hot wire to energize battery charger		each	664	840.00	995	1,260	2,100.00
	Exterior							
LX-1, LX	Pole mounted, including metal halide fixture and 14' pole		each	885	1,120.00	1,327	1,680	2,800.00
LX-2	Wall mounted compact fluorescent above doors		each	1,359	1,720.00	2,038	2,580	4,300.00
LX-3	LED bollard		each	822	1,040.00	1,232	1,560	2,600.00
	Extra materials							
	Lamps		each	2,054	2,600.00	3,081	3,900	6,500.00
	Diffusers, lenses, louvers and cones		each	2,433	3,080.00	3,650	4,620	7,700.00
	Ballasts, fluorescent, hid		each	1,422	1,800.00	2,133	2,700	4,500.00
	Miscellaneous		ls	1,580	2,000.00	2,370	3,000	5,000.00
	Lighting outlets		each	7,900	10,000.00	11,850	15,000	25,000.00
	Fixture tails		each	7,584	9,600.00	11,376	14,400	24,000.00
	Lighting fixtures conduit and wire							
	Conduit assorted, including elbows, connectors, couplings and straps		lf	3,792	4,800.00	5,688	7,200	12,000.00
	Wire assorted		lf	1,264	1,600.00	1,896	2,400	4,000.00
	Junction boxes		each	1,264	1,600.00	1,896	2,400	4,000.00
	Grounding		ls	1,327	1,680.00	1,991	2,520	4,200.00
	Sub total			93,915	118,880.00	140,873	178,320	297,200.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder:

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
280000	***ELECTRONIC SAFETY AND SECURITY***							
280800	**Commissioning of Electronic Safety and Security**		ls	1,580	2,000.00	2,370	3,000	5,000.00
	Sub total			1,580	2,000.00	2,370	3,000	5,000.00
283100	**Fire Alarm System**							
	Fire alarm control panel		each	4,740	6,000.00	7,110	9,000	15,000.00
	Devices							
	Manual fire alarm actuating device		each	4,740	6,000.00	7,110	9,000	15,000.00
	Horn and strobe		each	2,370	3,000.00	3,555	4,500	7,500.00
	Strobe		each	1,896	2,400.00	2,844	3,600	6,000.00
	Ceiling mounted smoke detector		each	2,054	2,600.00	3,081	3,900	6,500.00
	Duct mounted smoke detector		each	2,370	3,000.00	3,555	4,500	7,500.00
	Ceiling mounted CO detector		each	1,327	1,680.00	1,991	2,520	4,200.00
	Water flow switch		each	1,896	2,400.00	2,844	3,600	6,000.00
	Tamper switch		each	1,896	2,400.00	2,844	3,600	6,000.00
	10" bell		each	1,422	1,800.00	2,133	2,700	4,500.00
	Outlets		each	474	600.00	711	900	1,500.00
	Conduit		lf	474	600.00	711	900	1,500.00
	Wire		lf	474	600.00	711	900	1,500.00
	Fire alarm							
	Equipment		each	2,528	3,200.00	3,792	4,800	8,000.00
	Flow switch		each	3,002	3,800.00	4,503	5,700	9,500.00
	FCO Fused cut out		each	3,476	4,400.00	5,214	6,600	11,000.00
	Dedicated telephone line to central monitoring							
	Panels							
	FACP Fire alarm control panel		each	2,370	3,000.00	3,555	4,500	7,500.00
	FARA Fire alarm annunciator panel		each	2,528	3,200.00	3,792	4,800	8,000.00
	Devices							
	Manual pull station		each	1,106	1,400.00	1,659	2,100	3,500.00
	Strobe		each	632	800.00	948	1,200	2,000.00
	Horn strobe		each	316	400.00	474	600	1,000.00
	10" exterior bell		each	632	800.00	948	1,200	2,000.00
	Detectors							
	Smoke, ceiling		each	790	1,000.00	1,185	1,500	2,500.00
	Smoke, duct		each	790	1,000.00	1,185	1,500	2,500.00
	Outlets		each	948	1,200.00	1,422	1,800	3,000.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Conduits		lf	379	480.00	569	720	1,200.00
	Wire		lf	379	480.00	569	720	1,200.00
	Data/telephone system							
	Combination telephone/data floor outlets		each	348	440.00	521	660	1,100.00
	Combination telephone/data wall outlets		each	758	960.00	1,138	1,440	2,400.00
	3/4" conduit with pull line		lf	506	640.00	758	960	1,600.00
	Equipment and cable/wire							
	CCTV system							
	Outlets		each	1,422	1,800.00	2,133	2,700	4,500.00
	3/4" conduit with pull line		lf	2,054	2,600.00	3,081	3,900	6,500.00
	Equipment and cable/wire							
	Rack		each	1,580	2,000.00	2,370	3,000	5,000.00
	Recorder		each	1,580	2,000.00	2,370	3,000	5,000.00
	Monitors		each	1,264	1,600.00	1,896	2,400	4,000.00
	Work station with software		each	2,528	3,200.00	3,792	4,800	8,000.00
	Cameras, fixed		each	948	1,200.00	1,422	1,800	3,000.00
	Cable/wire		lf	1,580	2,000.00	2,370	3,000	5,000.00
	Access control system							
	Card reader		each	5,187	6,566.40	7,781	9,850	16,416.00
	Exit alarm with sounding device		each	2,370	3,000.00	3,555	4,500	7,500.00
	System power supply		each	2,844	3,600.00	4,266	5,400	9,000.00
	Doorbell from front entry		each	474	600.00	711	900	1,500.00
	Buzzer to front entry		each	474	600.00	711	900	1,500.00
	Intrusion alarm system							
	Detectors		each	2,686	3,400.00	4,029	5,100	8,500.00
	Alarm device		each	1,422	1,800.00	2,133	2,700	4,500.00
	Main panel with keypad		each	1,264	1,600.00	1,896	2,400	4,000.00
	Remote keypad		each	1,738	2,200.00	2,607	3,300	5,500.00
	Sub total			79,037	100,046.40	118,555	150,070	250,116.00
310000	***EARTHWORK***							
312000	Earthwork							
	Erosion control							
	Silt fence		lf	474	600.00	711	900	1,500.00
	Erosion and sediment control barrier		lf	1,201	1,520.00	1,801	2,280	3,800.00
	Gravel construction entrance		sf	790	1,000.00	1,185	1,500	2,500.00
	Inlet protection		each	790	1,000.00	1,185	1,500	2,500.00
	Earthwork							

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	General excavation							
	Slab area		cy	5,372	6,800.00	8,058	10,200	17,000.00
	Footing/foundation wall		cy	5,846	7,400.00	8,769	11,100	18,500.00
	Footing and foundation access		cy	5,846	7,400.00	8,769	11,100	18,500.00
	Sub total			20,319	25,720.00	30,478	38,580	64,300.00
320000	***EXTERIOR IMPROVEMENTS***							
321000	**Bases, Ballasts and Paving**							
	Gravel/sand base buy, haul, place, compact		cy	1,580	2,000.00	2,370	3,000	5,000.00
	Backfill, compacted		cy	1,580	2,000.00	2,370	3,000	5,000.00
	Borrow fill buy, load, haul, place, compact							
	Topsoil		cy	1,422	1,800.00	2,133	2,700	4,500.00
	Disposal		cy	1,422	1,800.00	2,133	2,700	4,500.00
	Line & grade		ls	2,275	2,880.00	3,413	4,320	7,200.00
	Site preparation							
	General grading		sf	1,580	2,000.00	2,370	3,000	5,000.00
	Fine grading		sf	2,844	3,600.00	4,266	5,400	9,000.00
	Regrading, cut/fill/balance, uon		sf	1,580	2,000.00	2,370	3,000	5,000.00
	Landscape retaining walls							
	No footing		lf	2,781	3,520.00	4,171	5,280	8,800.00
	Footing		lf	3,476	4,400.00	5,214	6,600	11,000.00
	Sub total			20,540	26,000.00	30,810	39,000	65,000.00
321223	**Imprinted Asphalt and Asphalt Coatings**							
	Exterior dog run, light colored non textured coated asphalt		sf	1,896	2,400.00	2,844	3,600	6,000.00
	Street							
	On site		sf	2,370	3,000.00	3,555	4,500	7,500.00
	Public		sf	2,528	3,200.00	3,792	4,800	8,000.00
	Street repair		ls	1,580	2,000.00	2,370	3,000	5,000.00
	Sub total			8,374	10,600.00	12,561	15,900	26,500.00
321313	**Concrete Walks and Curbs**							
	Concrete walkways		sf	2,812	3,560.00	4,219	5,340	8,900.00
	Wheelchair and access ramps, pedestrian ramps		each	3,950	5,000.00	5,925	7,500	12,500.00
	Sub total			6,762	8,560.00	10,144	12,840	21,400.00
321413	**Precast Concrete Pavers**							

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Precast pavers		sf	5,562	7,040.00	8,342	10,560	17,600.00
	Sidewalk repair		ls	790	1,000.00	1,185	1,500	2,500.00
	Pads							
	Generator pad, complete		sf	632	800.00	948	1,200	2,000.00
	Curbs and gutters							
	Pre cast concrete		lf	790	1,000.00	1,185	1,500	2,500.00
	Steel faced		lf	1,296	1,640.00	1,943	2,460	4,100.00
	Sub total			9,069	11,480.00	13,604	17,220	**28,700.00**
323119	**Ornamental Fencing**							
	Fences							
	Dog run		sf	664	840.00	995	1,260	2,100.00
	Dog cage		sf	695	880.00	1,043	1,320	2,200.00
	General		sf	632	800.00	948	1,200	2,000.00
	Gates							
	Dog run gate		each	253	320.00	379	480	800.00
	Dog cage gate		each	253	320.00	379	480	800.00
	Pedestrian gate		each	253	320.00	379	480	800.00
	Sub total			2,749	3,480.00	4,124	5,220	8,700.00
323132	**Sliding Gate Operators**							
	Rolling		each	2,370	3,000.00	3,555	4,500	7,500.00
	20'		lf	664	840.00	995	1,260	2,100.00
	Parking lines							
	Pavement markings		each	1,106	1,400.00	1,659	2,100	3,500.00
	Directional arrows, 8' typical		sf	183	232.00	275	348	580.00
	No park hatching		each	183	232.00	275	348	580.00
	Stop lines		each	183	232.00	275	348	580.00
	Relocated sheds		each	183	232.00	275	348	580.00
	Bike rack		each	183	232.00	275	348	580.00
	Bench							
	Sub total			5,056	6,400.00	7,584	9,600	16,000.00
329200	**Turf and Grasses**							
W	Wildflower and grass mixture							
	Seed		sf	253	320.00	379	480	800.00
	Perennials		sf	237	300.00	356	450	750.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Sub total			490	620.00	735	930	1,550.00
329300	**Plants**							
	Street trees to remain, protect		each	632	800.00	948	1,200	2,000.00
	Red twig dogwood		each	695	880.00	1,043	1,320	2,200.00
	Summersweet		each	695	880.00	1,043	1,320	2,200.00
	Yellow wood		each	695	880.00	1,043	1,320	2,200.00
	Red cedar		each	695	880.00	1,043	1,320	2,200.00
	Sub total			3,413	4,320.00	5,119	6,480	10,800.00
033000	*UTILITIES*							
333000	**Internal Storm and Sanitary Drainage**							
	Site engineering							
	Fire protection							
	Water service connection(s) for fire suppression system, including piping and backfill, uon	Included						
	Plumbing							
	Water service connection for potable water system		each	632	800.00	948	1,200	2,000.00
	Piping							
	2"		lf	1,106	1,400.00	1,659	2,100	3,500.00
	Natural gas service connection		each	632	800.00	948	1,200	2,000.00
	Piping		lf					
	Electrical							
	Power							
	Trench including excavation, disposal and backfill and conuit and cable	See feeders						
	Electrical service connection		each	348	440.00	521	660	1,100.00
	Refurbish existing manhole		each	348	440.00	521	660	1,100.00
	3" sleeves		each	348	440.00	521	660	1,100.00
	Generator							
	Trench including excavation, disposal and backfill and conuit and cable	See feeders						
	Ats connection		each	348	440.00	521	660	1,100.00
	2" sleeve		each	348	440.00	521	660	1,100.00
	Telephone/data							
	Trench including excavation, disposal and backfill		lf	316	400.00	474	600	1,000.00
	Telephone/data service connections		each	316	400.00	474	600	1,000.00

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	End box, 3' - 6"l x 2' - 7"w x 2' - 0" d		each	316	400.00	474	600	1,000.00
	3" sleeves		each	316	400.00	474	600	1,000.00
	3" conduit		lf	316	400.00	474	600	1,000.00
	Cable/wire		lf	316	400.00	474	600	1,000.00
	Internal Storm and Sanitary Drainage							
	Temporary cleanout		each	79	100.00	119	150	250.00
	Yard drain		each	79	100.00	119	150	250.00
	Catch basin, type 2		each	79	100.00	119	150	250.00
	Storm water service connection to combined sewer, including piping and backfill, uon	See sanitary service co						
	Sanitary service connection		each	253	320.00	379	480	800.00
	Piping							
	6"		lf	253	320.00	379	480	800.00
	8"		lf	2,528	3,200.00	3,792	4,800	8,000.00
	10"		lf	1,896	2,400.00	2,844	3,600	6,000.00
	Sub total			11,171	14,140.00	16,756	21,210	35,350.00
334000	**Storm Drainage Utilities**							
	Storm water detention							
	In ground drywalls, 10' diameter, 11' deep, complete, including excavation, disposal and backfill		each	2,503	3,168.00	3,754	4,752	7,920.00
	Sub total			2,503	3,168.00	3,754	4,752	7,920.00
	TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK			1,889,680	2,392,000.00	2,834,520	3,588,000	5,980,000.00

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: Minelli Construction Company, Inc

DDC Project Number: HL82SIABE

Company Size: _____ Ten (10) employees or less

X Greater than ten (10) employees

X Company has previously worked for DDC

2. Type(s) of Construction Work

TYPE OF WORK	LAST 3 YEARS	THIS PROJECT
General Building Construction	yes	yes
Residential Building Construction	no	no
Nonresidential Building Construction	no	no
Heavy Construction, except building	yes	no
Highway and Street Construction	yes	no
Heavy Construction, except highways	yes	no
Plumbing, Heating, HVAC	yes	yes
Painting and Paper Hanging	yes	yes
Electrical Work	yes	yes
Masonry, Stonework and Plastering	yes	yes
Carpentry and Floor Work	yes	yes
Roofing, Siding, and Sheet Metal	yes	yes
Concrete Work	yes	yes
Specialty Trade Contracting	yes	yes
Asbestos Abatement	yes	no
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	INTRASTATE RATE	INTERSTATE RATE
2012	.91	.91
2011	.92	.92
2010	.94	.94

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.

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

YEAR	TOTAL NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE
2012	290,000	3.7
2011	285,000	2.8
2010	279,500	3.2

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: 4/16/13

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

Title: V.P.

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
Washington Houses	Exterior Restoration	20,300,000	2009	NYC Housing Authority	PMS Construction Corp. Rich Dietrich 914-633-7500
Thomas Hunter Hall/Hunter College	Exterior Interior Restoration	11,200,000	2012	DASNY	DASNY, Ed Wagner 646-206-9148
PS 38	Exterior Interior Restoration	4,620,000	2009	SCA	Jean Clerk
Metropolitan High School	Exterior Interior Restoration	5,185,000	2012	SCA	SCA, Calvin Steele 718-472-8000
IS 144	Exterior Interior Restoration	4,860,000	2012	SCA	SCA, Tracy Ray 718-472-8000
HS 655	Exterior Interior Restoration	9,300,000	2013	SCA	SCA, Richard Deluca 718-472-8000
Morris HS	Exterior Interior Restoration	17,600,000	2011	SCA	SCA, Ricardo Rivera 347-865-0764

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
Old Westbury	Interior Restoration	13,689,000	9,000,000	11,655,553	8/2014	SUNY	Cannon Design Danielle Debbo 646-862-7572
PS 185	Exterior Restoration	6,690,000	838,329.53	5638861.39	9/6/14	SCA	718-472-8523 SCA
Bushwick HS	Exterior + Interior Restoration	11,670,000	1,885,074.13	10905554.42	3/7/14	SCA	SCA Michael Shalyt 718-472-8000
Sheepshead HS	Exterior Interior Restoration	9,000,000	3,805,201.62	7492651.10	1/2014	SCA	SCA Ed Cunningham 718-472-8000
IS 171	Exterior work and site work	4,890,885	968,665	926105.96	10/24/13	SCA	SCA Everton Mack 718-472-8000

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. - NONE

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

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: Mirelli Construction Co
Bidder's Address: 300 Corporate Plaza Islandia, NY 11749
Bidder's Telephone Number: 631-232-0222
Bidder's Fax Number: 631-232-0303
Date of Bid Opening: April 16, 2013
Project ID: HL82S1ABE

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: April 16, 2013

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: Joseph Spano

DIRECTIONS: Please execute two originals (both with original signature). Please forward directly to the agency (not M.O.C.S.).

CERTIFICATION OF NO CHANGE

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 MATTER OF THIS CERTIFICATION, MAY RESULT IN RENDERING THE SUBMITTING ENTITY NON-RESPONSIBLE FOR THE PURPOSE OF CONTRACT AWARD, AND A MATERIALLY FALSE STATEMENT WILLFULLY OR FRAUDULENTLY MADE IN CONNECTION WITH THIS CERTIFICATION MAY SUBJECT THE PERSON MAKING THE FALSE STATEMENT TO CRIMINAL CHARGES.

Submitting entity Minelli Construction Co. Inc.
Are you submitting this Certification as a parent? ☒ **Yes** / ☐ **No**
EIN/TIN 11-2608413
Address 300 Corporate Plaza Islandia, NY 11749
Agency _____

I, Joseph Spano, being duly sworn, state that I have read and understand all the items contained in the VENDOR questionnaire, dated 1/18/12 [if applicable: and the submission(s) dated _____, updating the information in that questionnaire]; and that, to the best of my knowledge, information and belief, the answers contained in the _____ questionnaire [if applicable: as modified by the submission(s) dated _____,] 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. I further certify on behalf of the **submitting vendor** that the information contained in the **principal questionnaires** for John Gertonson, dated 1/18/12, Joseph Spano, dated 1/18/12, _____, dated _____, [if applicable: and the submission(s) dated _____, updating the information in those questionnaires] has been verified and continues 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.

Sworn to before me this 16 day of April 2013

Notary Public Carole Fasano	CAROLE FASANO Notary Public, State of New York Qualified in Suffolk County No. 01FA4[illegible]012 Commission Expires May 11, 2015
	County License Issued License Number

BY Joseph Spano
Print name

Vice President
Title

Signature _____ Date _____

ON BEHALF OF Minelli Construction Co., Inc.
Name of submitting entity

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 X Subcontractor ___

1a. Are M/WBE goals attached to this project? Yes X 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 X

3. Please indicate if you would like assistance from SBS in identifying certified M/WBEs for contracting opportunities: Yes X No___

4. Is this project subject to a project labor agreement? Yes X No ____

PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

5. 11-2608413 Erin@minelliconstruction.co
Employer Identification Number or Federal Tax I.D./ Email Address

6. Minelli Construction Co Inc.
Company Name

7. 300 Corporate Plaza Islandia NY 11749
Company Address and Zip Code

8. John Gertonson 631 232 0222
~~Chief Operating Officer~~ President Telephone Number

9 Erin Egan 631 232 0222
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: 50 - 200

12. Contract information:

(a) NYCDDC
Contracting Agency (City Agency)

(b) $5,995,000
Contract Amount

(d) 85020131HL0001C
Procurement Identification Number (PIN)

(e) _____
Contract Registration Number (CT#)

(f) _____
Projected Commencement Date

(g) _____
Projected Completion Date

(h) Description and location of proposed contract:

Staten Island Animal Shelter

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 X

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 X

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. Below available for office staff only

___ (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 <u>and of whom</u> does your firm require the completion of an I-9 Form?

(a) Prior to job offer	Yes___	No X
(b) After a conditional job offer	Yes___	No X
(c) After a job offer	Yes___	No X
(d) Within the first three days on the job	Yes X	No___
(e) To some applicants	Yes___	No X
(f) To all applicants	Yes___	No X
(g) To some employees	Yes___	No X
(h) To all employees	Yes X	No___

20. Explain where and how completed I-9 Forms, with their supportive documentation, are maintained and made accessible.
I-9 forms are maintained in locked Files at Minelli Corporate offices.

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.
EEO policy is 1 page, located in Minelli Corporate Office

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 X No___

If yes, please attach a copy of this policy.
Available from each union
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.

SIGNATURE PAGE

I, (print name of authorized official signing) Erin Egan 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.

Minelli Construction Co Inc
Contractor's Name

Erin Egan — Asst. Project Mgr
Name of person who prepared this Employment Report — Title

Erin Egan — Asst. Project Mgr
Name of official authorized to sign on behalf of the contractor — Title

631 232-0222
Telephone Number

Signature of authorized official — 05/22/2013 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/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 22 day of May 20 13

Carole Fasano — 05/22/2013
Notary Public — Authorized Signature — Date

CAROLE FASANO
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01FA4894012
Qualified in Suffolk County
Commission Expires May 11, 2015

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 SI Animal and located at Staten Island, NY (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 form identical to this document.

Dated: 06/03/2013

Minelli Construction Co Inc
(Name of Contractor or subcontractor)

Minelli Construction Co
(Name of CM; GC; Contractor or Higher Level Subcontractor)

Joseph Spano
(Authorized Officer & Title)

300 Corporate plaza Islandia NY
(Address)

631 232 0222 / 0303
(Phone) (Fax)

Contractor's State License #

Sworn to before me this 3 day of June 2013

Carole Fasano
Notary Public

CAROLE FASANO
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01FA4894012
Qualified in Suffolk County
Commission Expires May 11, 2015

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: Suffolk, New York
16th April, 2013

SIGNATURE

Joseph Spano
PRINTED NAME

V. P
TITLE

Sworn to before me this
16th day of April 2013

Notary Public

CAROLE FASANO
Notary Public, State of New York
Qualified in Suffolk County
No. 01FA6194012
Commission Expires May 11, 2015

Dated:

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

April 4, 2013

ADDENDUM No. # 1

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

HL82SIABE
Staten Island Animal Care and Control Center Reconstruction

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for April 10, 2013, at 2:00 pm is rescheduled to April 16, 2013, at 2:00 pm.**

   Contract #1 – General Construction Work

2. **Bidders Questions and Responses to Questions:**

   See Attachment A.

3. **Revisions to Specifications:**

   See Attachment B.

4. **Revisions to Drawings:**

   See Attachment C.

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

Minelli Construction Company
Name of Bidder

By: Joseph Spano V.P.

[*]

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

April 9, 2013

ADDENDUM No. # 2

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

HL82SIABE
Staten Island Animal Care and Control Center Reconstruction

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **Bidders Questions and Responses to Questions:**
   See Attachment A.

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

Minelli Construction Company
Name of Bidder

By: Joseph Spano V.P.

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: HL82SIABE

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

BID BOOKLET

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

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)
- MWBE Subcontractor 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)

FAILURE TO SUBMIT THE SEVEN 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 additional information is required, please contact DDC at 718-391-2601.

(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**	**___X___ YES**	**_____ NO**
Specific Areas of Work:	**General Construction**	**___X___ YES**	**_____ 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 024119: Selective Demolition and Alteration Work
- Section 051200: Structural Steel
- Section 074196: Polycarbonate Exterior Panels
- Section 075200: Modified Bitumen 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: HL82SIABE

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

SUBCONTRACTOR UTILIZATION PLAN

Schedule B: Subcontractor Utilization Plan: Schedule B: Subcontractor Utilization Plan for this Contract is set forth on the following pages of this Bid Booklet. Schedule B: Subcontractor 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 Schedule B: Subcontractor Utilization Plan (Part II) with its bid.

Contract Provisions: Contract provisions regarding the participation of the MWBE firms are set forth in Article 77 of the Contract. The bidder is advised to review these contract provisions.

Waiver: The bidder may seek a full or partial pre-award waiver of the Target Subcontracting Percentage in accordance with Article 77 of the Contract (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 Target Subcontracting Percentage is set forth in Schedule B: Subcontractor Utilization Plan (Part III).

Rejection of the Bid: The bidder must complete Schedule B: Subcontractor Utilization Plan (Part II) set forth on the following pages. Subcontractor Utilization Plans which do not include the required affirmations (on Page 2) will be deemed to be non-responsive, unless a full waiver of the Target Subcontracting Percentage is granted (Schedule B: Subcontractor Utilization Plan, Part III). In the event that the City determines that the bidder has submitted a Schedule B: 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 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 plan 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 goals have been established for the participation of M/WBE's, 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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Tax ID #: _____ PIN#: **8502013HL0001C**

Contract # 1 - General Construction Work

The City of New York

SCHEDULE B: Subcontractor Utilization Plan -Part I: Agency's Target

This page to be completed by contracting agency

Contract Overview

Pin #	**8502013HL0001C**	**FMS Project ID#:**	**HL82SIABE**		
Project Title	Staten Island Animal Care and Control Center Reconstruction				
Contracting Agency	Department of Design and Construction				
Agency Address	30-30 Thomson Avenue	**City**	Long Island City	**State** NY	**Zip Code** 11101
Contact Person	Norma Negron	**Title**	MWBE Liaison & Compliance Analyst		
Telephone #	(718) 391-1502	**Email**	negronn@ddc.nyc.gov		

Project Description *(attach additional pages if necessary)*

This project consists of the reconstruction of a 5065 square foot single story Animal Care Center to include General Construction work, Plumbing work, HVAC and Fire Protection work, and Electrical work.

(1) √ **Target Subcontracting Percentage**

Percentage of total contract dollar value that agency estimates will be awarded to subcontractors in amounts under $1 million for construction and professional services. **40** %

Subcontractor Participation Goals

Complete and enter total for each Construction or Professional Services, or both (if applicable)

Group	Construction	Professional Services
Black American	**Unspecified** %	%
Hispanic American	**Unspecified** %	%
Asian American	**Unspecified** %	No Goal
Caucasian Female	No Goal	%
Total Participation Goals	**(2) 20** %	**(3)** %

* Note: For this procurement, individual ethnicity and gender goals are not specified. The Total Participation Goals for construction subcontracts may be met by using Black American, Hispanic American or Asian American firms or any combination of such firms.

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Tax ID #: _____ PIN#: _____

SCHEDULE B - Subcontractor Utilization Plan – Part II: Bidder/Proposer Subcontracting Plan

This page and the next (Part II herein) are to be completed by the bidder/proposer. AFFIRMATIONS; Bidder/proposer must check the applicable boxes below, affirming compliance with M/WBE requirements.

Bidder/proposer ☐ **AFFIRMS or** ☐ **DOES NOT AFFIRM [statement below]**

It is a material term of the contract to be awarded that, with respect to the total amount of the contract to be awarded, bidder/proposer will award one or more subcontracts for amounts under one million dollars, sufficient to meet or exceed the Target Subcontracting Percentage (as set forth in Part I) unless it obtains a full or partial waiver thereof, and it will award subcontracts sufficient to meet or exceed the Total Participation Goals (as set forth in Part I) unless such goals are modified by the Agency.

Bidder/proposer

☐ **AFFIRMS that it intends to meet or exceed the Target Subcontracting Percentage (as set forth in Part 1); or**

☐ **AFFIRMS that it has obtained a full/partial pre-award waiver of the Target Subcontracting Percentage (as set forth in Part I) and intends to award the modified Target Subcontracting Percentage, if any; or**

☐ **DOES NOT AFFIRM**

Section I: Prime Contractor Contact Information

Tax ID # _____ **FMS Vendor ID #** _____

Business Name _____ **Contact Person** _____

Address _____

Telephone # _____ **Email** _____

Section II: General Contract Information

1. **Define the industry in which work is to be performed.**
   - **Construction** includes all contracts for the construction, rehabilitation, and/or renovation of physical structures. This category does include CM Build as well as other construction related services such as: demolition, asbestos and lead abatement, and painting services, carpentry services, carpet installation and removal, where related to new construction and not maintenance.
   - **Professional Services** are a class of services that typically require the provider to have some specialized field or advanced degree. Services of this type include: legal, management consulting, information technology, accounting, auditing, actuarial, advertising, health services, pure construction management, environmental analysis, scientific testing, architecture and engineering, and traffic studies, and similar services.

a. Type of work on Prime Contract *(Check one):* ☐ **Construction** ☐ **Professional Services**

b. Type of work on Subcontract *(Check all that apply):* ☐ **Construction** ☐ **Professional Services** ☐ **Other**

2. **What is the expected percentage of the total contract dollar value that you expect to award to all subcontracts?** _____ **%**
3. **Will you award subcontract(s) in amounts below $ 1 million for construction and/or professional services contracts within the first 12 months of the notice to proceed on the contract?** ☐ **Yes** ☐ **No**

Section III: Subcontractor Utilization Summary

IMPORTANT*: If you do not anticipate that you will subcontract at the target level the agency has specified, because you will perform more of the work yourself, you must seek a waiver of the Target Subcontracting Percentage by completing p. 9).*

Step 1: Calculate the percentage (of your total bid) that will go towards subcontracts under $1M for construction and/or professional services	**Subcontracts under $1M (4)** (construction/professional services)		**Total Bid/Proposal Value**		**Calculated Target Subcontracting Percentage**
	$ _____	÷	$ _____	x 100 =	_____ %

- **Subcontracts under $1M (construction/professional services):** Enter the value you expect to award to subcontractors in dollars for amounts under $1 million for construction and/or professional services. This value defines the amount that participation goals apply to, and will be entered into the first line of Step 2.
- **Total Bid/Proposal Value:** Provide the dollar amount of the bid/proposal.
- **Calculated Target Subcontracting Percentage:** The percentage of the total contract dollar value that will be awarded to one or more subcontractors for amounts under $1 million for construction and/or professional services. **This percentage must equal or exceed the percentage listed by the agency on page 1, at line (1).**

NOTE: The "Calculated Target Subcontracting Percentage" MUST equal or exceed the Target Subcontracting Percentage listed by the agency on Page 6, Line (1).

Tax ID #: _____ PIN#: _____

SCHEDULE B - cont.

Step 2:
Calculate value of subcontractor participation goals

Subcontracts under $1M
(construction/professional services)

a. Copy value from Step 1, line (4) – the total value of all expected subcontracts under $1M for construction and/or professional services

$ _____

b. * From line a. above, allocate the dollar value of "Subcontracts under $1M" by Construction and Professional Services,

* If all subcontracts under $1M are in one industry, enter '0' for the industry with no subcontracts.

* Amounts listed on these lines should add up to the value from line a.

	Construction	Professional Services
Subcontracts under $1M by Industry	$ _____	$ _____

* For Construction enter percentage from line (2) from Page 6.

* For Professional Services enter percentage from line (3) from Page 6.

c. * **Total Participation Goals Percentages must be copied from Part I, lines (2) and (3).**

Total Participation Goals	x _____ %	x _____ %

d. **Value of Total Participation Goals**

	$ _____	$ _____

Step 3:

☑ **Subcontracts in Amounts Under $1 M Scope of Work – Construction**

Enter brief description of type(s) of subcontracts in amounts under $1M anticipated, by type of work, not by name of subcontractor

☑ **Subcontracts in Amounts Under $1 M Scope of Work – Professional Services**

Enter brief description of type(s) of subcontracts in amounts under $1M anticipated, by type of work, not by name of subcontractor

Section IV: Vendor Certification and Required Affirmations

I hereby 1) acknowledge my understanding of the M/WBE requirements as set forth herein and the pertinent provisions of Local Law 129 of 2005, and the rules promulgated thereunder; 2) affirm that the information supplied in support of this subcontractor utilization plan is true and correct; 3) agree, if awarded this Contract, to comply with the M/WBE requirements of this Contract and the pertinent provisions of Local Law 129 of 2005, 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 subcontract(s) sufficient to meet the Target Subcontracting Percentage, unless a waiver is obtained, and the Vendor will award subcontract(s) sufficient to meet the Total Participation Goals unless such goals are modified by the Agency; and 5) agree and affirm, if awarded this contract the Vendor intends to make all reasonable, good faith efforts to meet the Target Subcontracting Percentage, or If the Vendor has obtained a waiver, the Vendor intends to meet the modified Target Subcontracting Percentage, if any , and the Vendor intends to to solicit and obtain the participation of M/WBEs so as to meet the Total Participation Goals unless modified by the Agency.

Signature _____ Date _____

Print Name _____ Title _____

Tax ID #: _____ PIN#: _____

SCHEDULE B

PART III – REQUEST FOR WAIVER OF TARGET SUBCONTRACTING PERCENTAGE

Contract Overview

Tax ID # _____ **FMS Vendor ID #** _____

Business Name _____

Contact Name _____ **Telephone #** _____ **Email** _____

Type of Procurement ☐ Competitive Sealed Bids ☐ Other **Bid/Response Due Date** _____

PIN # (for this procurement)	Type of work on Prime Contract *(Check one):*	Type of work on Subcontract *(Check all that apply):*	
_____	☐ Construction ☐ Professional Services	☐ Construction ☐ Professional Services	☐ Other

SUBCONTRACTING *as described in bid/solicitation documents (Copy this % figure from Subcontactor Utilization Plan, Part I, lin*

_____ % of the total contract value anticipated by the agency to be subcontracted for construction/professional services subcontracts valued below $1 million (each)

ACTUAL SUBCONTRACTING *as anticipated by vendor seeking waiver*

_____ % of the total contract value anticipated in good faith by the bidder/proposer to be subcontracted for construction/ professional services subcontracts valued below $1 million (each)

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

☐ Vendor does not subcontract construction/professional services, and has the capacity and good faith intention to perform all such work itself.

☐ Vendor subcontracts *some* of this type of work but at *lower* % than bid/solicitation describes, and has the capacity and good faith intention to do so on this contract.

☐ Other _____

References

List 3 most recent contracts/subcontracts performed for NYC agencies (if any)

CONTRACT NO. _____ AGENCY _____ DATE COMPLETED _____

CONTRACT NO. _____ AGENCY _____ DATE COMPLETED _____

CONTRACT NO. _____ AGENCY _____ DATE COMPLETED _____

List 3 most recent contracts/subcontracts performed for other agencies/entities
(complete ONLY if vendor has performed fewer than 3 NYC contracts)

TYPE OF WORK _____ AGENCY/ENTITY _____ DATE COMPLETED _____
Manager at agency/entity that hired vendor (Name/Phone No.) _____

TYPE OF WORK _____ AGENCY/ENTITY _____ DATE COMPLETED _____
Manager at agency/entity that hired vendor (Name/Phone No.) _____

TYPE OF WORK _____ AGENCY/ENTITY _____ DATE COMPLETED _____
Manager at agency/entity that hired vendor (Name/Phone No.) _____

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 CHIEF CONTACTING OFFICER APPROVAL

Signature: _____ **Date:** _____

CITY CHIEF PROCUREMENT OFFICER APPROVAL

Signature: _____ **Date:** _____

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

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

PROJECT ID: HL82SIABE

Staten Island Animal Care and Control Center Reconstruction
3139 Veterans Road West
Staten Island 10309

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 15 of this Bid Booklet.

The bidder hereby affirms that is 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:

BID FORM

PROJECT ID: HL82SIABE

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, excluding item (B) 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 Labor		Total Price for Material Sold and Delivered			
$_____	+	$_____	Total Price for Item A	$_____

B. ALLOWANCE for Incidental Asbestos Abatement (Section 028013 of the Specifications) **$15,000.00**

TOTAL BID PRICE (Add A + B) (a/k/a BID PROPOSAL) $_____

BIDDER'S SIGNATURE AND AFFIDAVIT

WARNING!! Failure to comply with items below will result in the rejection of your bid.

* **SUBCONTRACTORS: You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (See 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**

* **MWBE GOALS: You MUST complete and submit the Affirmations contained in the Subcontractor Utilization Plan (See Page 7), or a pre-approved waiver (See Page 9), at the time you submit your bid. You must submit the Affirmations (or a pre-approved waiver) in BID ENVELOPE #1.**

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

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 Local Law 129, 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 Target Subcontracting Percentage identified in the Subcontractor Utilization Plan, the bid will be non-responsive unless the bidder requests and obtains a Waiver of Target Subcontracting Percentage (Subcontractor Utilization Plan, Part III) in advance of bid submission.

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

Project ID: HL82SIABE

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 fulfullment 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) _____ (L.S.)
Principal

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 inidicated 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: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
CONTRACT 1 - GENERAL CONSTRUCTION WORK								
010000	***GENERAL REQUIREMENTS***							
	Mobilization		ls					
	Site survey of material delivery and work conditions							
	Delivery of on site equipment and tools							
	Set up of material storage areas and security of materials							
	Plan for security of materials							
	Demobilization		ls					
	Removal of on site equipment and tools							
	Removal of storage areas							
	Subcontractor cleanup of storage areas							
	Phasing		ls					
	Temporary close off wall including removal and disposal		sf					
	Temporary facilities		ls					
	Sub total							
013329	**LEED Submittals**		ls					
017419	**Construction Waste Management**		ls					
018113	**LEED Requirements**		ls					
018116	**Environmental Practices**		ls					
018119	**Construction IAQ Management**		ls					
018419	**VOC Limits for Adhesives, Sealants and Architectural Coatings**		ls					
019113	**General Commissioning Requirements**		ls					
	Sub total							
020000	***EXISTING CONDITIONS***							
024116	**Building Demolition**							
	Building		sf					
	Sub total							

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
024119	**Selective Demolition and Alteration Work**							
	Demolition							
	Site							
	Site clearing							
	Clearing, including removal of vegetation, brush and shrubs and miscellaneous other structures, uon		sf					
	Tree removal							
	Street		each					
	Site		each					
	Sidewalk		sf					
	Curb		lf					
	Pavement		sf					
	Cage/storage areas pads/paving		sf					
	Site improvements							
	Fences		lf					
	Gates		pair					
	Signs		each					
	Plumbing							
	Sewer and vent		ls					
	Drywell rings		each					
	Septic tank		each					
	Leaching field		each					
	Electrical							
	Disconnect and make safe		ls					
	Foundations							
	Footings		lf					
	Grade wall		sf					
	Water sprinkling		days					
	Perimeter air monitoring, including meteorological station, uon		ls					
	Regrade		sf					
	Equipment							
	Storage sheds for relocation		each					
	Sub total							

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
28213	**Asbestos Abatement**							
			ls					
	Sub total							
030000	***CONCRETE [including reinforcing and formwork, unless otherwise noted]***							
032400	**Fibrous Reinforcing**	Included in concrete						
033000	**Cast In Place Concrete**							
	Pits							
	House trap		each					
	Footings							
	Continuous		cy					
	Exterior screen wall		cy					
	Column		cy					
	Piers		each					
	Foundation grade wall							
	0.7		cy					
	1.0		cy					
	Light pole		cy					
	Sub total							
035300	**Concrete Floor Topping**							
	Unframed		cy					
	Loading dock, complete		sf					
	Slab above grade							
	Framed		cy					
	Troughs		lf					
	Curbs, slab elevations and depressions		ls					
	Sub total							
040000	***MASONRY AND STONE***							
042000	**Unit Masonry**							
	Walls							
A	8" GFCMU		sf					
B	4" GFCMU with 4" CMU (with clerestory)		sf					
B1	4" GFCMU with 4" CMU		sf					

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			Quan.	Unit	Material		Labor		Total M & L
					Cost	Extension	Cost	Extension	
	C/C1	4" GFCMU with CMU (and 4" insulation sandwich)		sf					
	D	Double 4" CMU (with 4" insulation sandwich)		sf					
		Partitions							
	E	4" CMU		sf					
	E1	4" CMU		sf					
	F	6" CMU		sf					
	F1	6" CMU		sf					
	F2	6" CMU (with clerestory)		sf					
	G	8" CMU		sf					
	G1	8" CMU		sf					
	G2	6" CMU (with clerestory)		sf					
		Infill at interior grille locations for insulated louvers (add alternate)		sf					
		Scaffolding/work platforms		ls					
	Roof pavers								
		On roofing							
		24" x 24" x 2" rubber pad		sf					
		Sub total							
050000	***METALS***								
051200	**Structural Steel**								
		Posts		lbs					
		Beams and girders		lbs					
		Channels		lbs					
		Angles		lbs					
		Plates		lbs					
		Girts		lbs					
		HSS		lbs					
		Angles, connections and plates		lbs					
		Deck bridging		lf					
		Cross bridging		lf					
		Diagonal bracing		lf					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Perimeter angles							
	3x3x1/4		lf					
	4x4x1/4		lf					
	4x4x3/8		lf					
	6x6x5/16		lf					
	Joist space angles							
	3x3x1/4, welded to joist and steel deck		lf					
	Sub total							
053000	**Metal Decking**							
	1 1/2" acoustical deck		sf					
	Edge stop		lf					
	Sub total							
054000	**Cold Formed Metal Framing**							
	Lintels							
	L 5 x 3 1/2 x 5/16"		lf					
	L 6 x 3 1/2 x 5/16"		lf					
	Joists							
	CF		lf					
	Sub total							
055000	**Miscellaneous Metals**							
	Canopy trim		lf					
	Trough cover plate		lf					
	Thresholds							
	Double		each					
	Single		each					
	Cattery							
	Floor		sf					
	Porthole wall		sf					
	Insulated ceiling		sf					
	Meet & greet window							
	Insulated surround		sf					
	Metal stairs		lfr					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Sheet metal fabrications							
	Coping		lf					
	Loading dock canopy		sf					
	Bearing plates and connectors, loose lintels and miscellaneous anchorage devices		ls					
	Miscellaneous metals including partition and ceiling supports, door lintels, shelf angles, motor supports, door supports		ls					
	Sub total							
060000	***WOOD, PLASTICS & COMPOSITES***							
062000	**Carpentry**							
	Formwork							
	Roof decking, 3/4" plywood		sf					
	Electrical, data and telephone backboards		sf					
	Sub total							
062023	**Cabinetry and Millwork**							
	Reception desk		lf					
	Cabinets							
	Base cabinet							
	Kitchen unit		lf					
	Veterinary remove and reinstall		lf					
	Wall upper cabinet							
	Kitchen unit		lf					
	Food prep		lf					
	Surgery remove and reinstall		lf					
	Veterinary remove and reinstall		lf					
	Counters							
	Manager, office, lunch		lf					
	Blocking/anchor to partition or wall		lf					
	Rough carpentry		ls					
	Sub total							
070000	***MOISTURE THERMAL SOUND FIRE CONTROL***							
071326	**Sheet Membrane Waterproofing**							
	Storage and utility area		sf					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Foundation wall		sf					
	Sub total							
072100	**Thermal Insulation**							
	Foundation		sf					
	Slab		sf					
	Wall		sf					
	Roof		sf					
	Sub total							
072616	**Below-Slab Vapor Retarder**							
	Horizontal							
	On grade		sf					
	Sub total							
072700	**Air and Vapor Barrier Membrane**							
	Vertical							
	Exterior cmu		sf					
	Sub total							
074196	**Polycarbonate Exterior Panels**							
	Outside perimeter		sf					
	Inside clerestory		sf					
	Sub total							
074223	**Preformed Wood Exterior Ceiling Panels**							
	Canopy underside		sf					
	Sub total							
075200	**Modified Bitumen Roofing**							
	SBS modified bitumin roof, 2 ply, reflective		sf					
	Ballast/mechanical attachment		sf					
	Sub total							

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
076200	**Sheet Metal Work**							
	Flashing		lf					
	Sub total							
077100	**Roof Specialties and Accessories**							
	Roof hatch with ladder		each					
	Ships ladder		each					
	Sub total							
078413	**Firestops and Smokeseals**	Included in assemblies						
079200	**Joint Sealers**	Included in assemblies						
079500	**Expansion Control**	Included in assemblies						
	miscellaneous caulking and sealing		ls					
	Sub total							
080000	***OPENINGS***							
081113	**Steel Doors and Frames**							
	Exterior							
	Garden wall		each					
	Metal		pair					
	Sub total							
081119	**Stainless Steel Doors and Frames**							
	D Porthole		each					
	E Solid 7' - 4" high		each					
	F Solid 7' - 6" high		each					
	G Porthole with sidelight 4' - 5" wide total		each					
	G1 Porthole with sidelight 4' - 8" wide total		each					
	Sub total							
083113	**Access Doors**							
	Floor		each					
	Sub total							
083473	**Sound Control Hollow Metal Door Assemblies**							
	Door assemblies		each					
	Sub total							

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
084113	**Aluminum Entrances and Storefronts**							
	Entrance/vestibule							
	A Glass/metal		pair					
	Sub total							
084228	**All Glass Doors**							
	C Glass with sidelight		each					
	H Glass		each					
	Add for							
	180 swing		each					
	Dual swing		each					
	Electric strike		each					
	Exit device		each					
	Fire rated stainless steel doors at mechanical and electric rooms		each					
	Key box		each					
	Sub total							
087100	**Door Hardware**	See doors						
088000	**Glass and Glazing**							
	Windows							
	Aluminum window		sf					
	Sidelights		sf					
	Port hole window		sf					
	Storefront		sf					
	Clerestories							
	B (4" CMU with brick facing with) clerestory		sf					
	F2 6" CMU (with clerestory)		sf					
	F3 (6" CMU with) clerestory		sf					
	G2 6" CMU (with clerestory)		sf					
	Interior polycarbonate transom, 3/8" laminated glass, top and bottom spacers, 16mm polycarbonate, add		sf					
	Glass and glazing							
	Cattery		sf					
	Sidelights		sf					
	Surgery		sf					
	Sub total							

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
089000	**Louvers and Vents**							
	Aluminum louver							
	Exterior		sf					
	Sub total							
090000	***FINISHES***							
092900	**Gypsum Drywall**							
	Partitions							
	Fire rated at mechanical room		sf					
	Sub total							
093000	**Ceramic Tile**							
	Ceramic, unglazed porcelain tile		sf					
	Floor							
	Resilient Sheet		sf					
	Sealed, polyurethane		sf					
	Base							
	Ceramic, unglazed porcelain tile		lf					
	Sub total							
095150	**Wood Composite Ceiling Panels**							
	Wood panel		sf					
	Sub total							
096723	**Epoxy Resin Composition Flooring and Wall Coverings**							
	Epoxy		sf					
	Sub total							
09 8433	**Acoustic Wall Panels**							
	Polycarbonate		sf					
	Factory finish painted deck	Included in deck						
	Fire rated 1 hour horizontal shaft assembly at electrical and mechanical rooms, painted		sf					
	Sub total							

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
099000	**Painting and Finishing**							
	Paint							
	Seal		sf					
	Coating at animal areas		sf					
	Ceramic, unglazed porcelain tile		sf					
	Sub total							
100000	***SPECIALTIES***							
101400	**Signage**							
	Jakob webnet							
	Cattery		sf					
	Visual display boards							
	Tack		each					
	Traffic/parking							
	Stop		each					
	Do not enter		each					
	Handicap parking		each					
	Special parking		each					
	Interior							
	Toilets/mechanical		each					
	Room id, custom shaped laser cut aluminum		each					
	Directional/restrictional		each					
	Location		each					
	Exterior, complete		each					
	Sub total							
102800	**Toilet accessories**							
	Mirrors with stainless steel frames		each					
	Soap dispenser		each					
	Towel dispenser and disposal unit		each					
	Sanitary dispenser and disposal unit		each					
	Toilet tissue dispenser		each					
	Toilet seat cover dispenser		each					
	Grab bar		sets					
	Mop and broom holder and shelving		each					
	Electric hand dryer		each					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Shelf units, 24" uon		each					
	Wardrobe & closet specialties							
	Clothes hooks		each					
	Door hooks		each					
	Shower accessories		each					
	Sub total							
104416	**Fire Extinguishers and Cabinets**							
	Type A water type		each					
	Sub total							
105113	**Lockers**							
	Miscellaneous holders, hooks, rods, strips		ls					
	Sub total							
110000	***EQUIPMENT***							
114520	**Stainless Steel Counters and Ledges**							
	Kitchen unit, ss		lf					
	Food prep, ss		lf					
	Surgery prep, ss		lf					
	Surgery remove and install		lf					
	Surgery, Veterinary install only (refrigerator)		each					
	Veterinary remove and reinstall		lf					
	Sink cuts		each					
	Sub total							
120000	***FURNISHINGS***							
124814	**Floor Mats and Frames**		ls					
	Sub total							
130000	***SPECIAL CONSTRUCTION***							
131915	**Animal Cages**		ls					
	Sub total							
210000	***FIRE SUPRESSION***							
21 0080	**Commissioning of Fire Suppression**		ls					
	Sub total							

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NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
21 1000	**Water Based Fire Suppression System**							
	Equipment							
	Water meter							
	DDCV		each					
	Pumps, vertical in line, uon							
	Fire pump [automatic], _gpm, _psi, _hp							
	Diesel		each					
	Fire pump [jockey], _gpm, _psi, _hp (with controller)		each					
	Gong		each					
	Sprinklers							
	Heads							
	Ordinary hazard, OH-1: 0.15 gal/min/sf; OH-2: 0.20 gal/min/sf		each					
	Piping schedule 40 black steel, typical							
	2" and less, schedule 40, uon		lf					
	2"+ and greater, schedule 10, uon		lf					
	Fittings (clamps, ells, wyes, tees & couplings) and valves		ls					
	Floor control assembly		each					
	Sprinkler zone valves		each					
	Test valve		each					
	Rigging, hoisting and scaffolding		ls					
	Sub total							
220000	***PLUMBING***							
22 0500	**Common Work Results For Plumbing**							
	Service							
	Water							
	Tap		each					
	Sanitary/storm							
	Tap		each					
	Gas							
	Tap		each					
	Equipment							
	ET-1 Expansion tank, 11 gallon		each					
	Pumps							
	Circulating		each					

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Traps, with frame and cover							
	House -"		each					
	Animal fur/hair interceptor		each					
	Neutralizing tank		each					
	Water meter rig		each					
	Sub total							
22 0503	**Pipes And Tubes For Plumbing Piping And Equipment**							
	Equipment piping including fittings		ls					
	Sub total							
22 0523	**General-Duty Valves For Plumbing Piping**							
	Backflow valves		each					
	Sub total							
22 0548	**Vibration, Noise Control and Seismic Controls for Plumbing Piping and Equipment**	Included in unit costs						
22 0553	**Plumbing Identification**	Included in unit costs						
22 0700	**Plumbing Insulation**							
	Personnel fixtures [cw/hw, vent, sanitary]		lf					
	Sub total							
22 0800	**Commissioning of Plumbing**							
	System sterilization and purity test		ls					
	Sub total							
22 1100	**Facility Water Distribution**	See fixture piping						
22 1300	**Facility Sanitary Sewerage**	See fixture piping						
22 1400	**Facility Storm Drainage**							
	Fixture piping: domestic water, type l; sanitary waste, ci no hub; storm, ci single hub, uon							
	Personnel fixtures [cw/hw, vent, sanitary]		lf					
	House fixtures [cw, vent, storm]		lf					
	Metal gutter		lf					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Integral metal gutter		lf					
	Downspout		each					
	Underground piping		lf					
	Fittings (clamps, ells, wyes, tees & couplings) and valves		ls					
	Joints							
	Personnel fixtures [cw/hw, vent, sanitary]							
	Couplings		each					
	Elbows		each					
	Tees		each					
	House fixtures [cw, vent, storm]							
	Couplings		each					
	Elbows		each					
	Tees		each					
	Sub total							
22 3400	**Fuel-Fired Domestic Water Heaters**							
	Hw tank							
	GWH-1 100 gallon storage, 171 gph recovery		each					
	Sub total							
22 4000	**Plumbing Fixtures**							
	Including rough in							
	Lavatories, including faucets and waste fittings							
	Wall		each					
	Sinks, including faucets and waste fittings							
	Counter							
	Surgery prep		each					
	Exam		each					
	Food prep/lunch		each					
	Wall							
	Recvovery/isolation/holding		each					
	Janitor/storage		each					
	Ewc, dual		each					
	Shower, including head and valve		each					
	Water closets, floor mounted, dual flush, uon							
	Handicap		each					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Capped and refrigerator outlets		each					
	Washer connections		each					
	Hose bibs, hot and cold water							
	Non freeze		each					
	Interior		each					
	Drains							
	Site		each					
	Floor							
	3"		each					
	4"		each					
	Shower		each					
	Roof , drains and overflow drains		each					
	Gas equipment and piping							
	Meter	Supplied by utility company, uon						
	Meter rig		each					
	Gas piping							
	Mains		lf					
	Distribution		lf					
	Fittings and valves		ls					
	Gas flue		lf					
	Pumps, gages, meters, thermometers		ls					
	Rigging, hoisting and scaffolding		ls					
	Sub total							
230000	*HVAC*							
23 0500	**Basic Mechanical Requirements**	Included in units						
23 0503	**Pipe And Fittings**	Included in units						
23 0513	**Motors**	Included in units						
23 0514	**Motors Starters And Wiring**	See electrical						
23 0529	**Supports And Anchors**							
	Supports							
	Prefab curb		lf					
	Sub total							
23 0548	**Vibration Isolation And Seismic Restraints**	Included in units						
23 0553	**Mechanical Identification**	Included in units						

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
23 0593	**Testing, Adjusting & Balancing (Tab) Of Mechanical Systems**							
	BMS contols							
	Equipment							
	Branch circuit controller, 8 zones		each					
	Central system control							
	I/O points							
	Roof top units		each					
	Split unit, condenser sections		each					
	Emergency generator		each					
	Conduit and wire							
	Conduit		lf					
	Wire		lf					
	Terminal equipment control							
	Split unit, evaporator sections		each					
	Exhaust fans		each					
	Unit heaters		each					
	Room humidity		each					
	Conduit and wire							
	Conduit		lf					
	Wire		lf					
	Rigging, hoisting and scaffolding		ls					
	Balancing							
	Roof top units		each					
	Condenser sections		each					
	Evaporator sections		each					
	Fans		each					
	Hydronic piping		lot					
	Water system		lot					
	Registers & grilles		each					
	Sub total							
23 0700	**Mechanical Insulation**	Included in units						
23 0800	**Commissioning of Mechanical Systems**							
	Code compliance test		ls					
	Sub total							

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		Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
23 2300	**Refrigerant Piping**	Included in units						
23 3000	**Ductwork And Accessories**							
	Distribution							
	Supply and return							
	Ductwork rectangular and circular, galvanized, uon		pounds					
	Fittings		pounds					
	6" gooseneck		each					
	Sub total							
23 3400	**Fans**							
	Exhaust fans							
	F-1 400		each					
	F-2 200		each					
	F-3 100		each					
	F-4 580		each					
	Sub total							
23 3700	**Air Outlets And Inlets**							
	Registers and diffusers:							
	LG-1 Spiral duct linear grille, extractor		each					
	CG-1 Square diffuser		each					
	RG-1 Filtered return grille, 2" merv filter		each					
	RG-2 Filtered return grille, 2" merv filter		each					
	WG-1 Round supply grille		each					
	WG-2 Supply grille		each					
	EG-1, 2 Exhaust grille		each					
	LFD-1 Laminar flow hepa supply diffuser, integral hepa filter		each					
	LFD-2 Laminar flow hepa supply diffuser, integral hepa filter		each					
	UFD-1 Linear floor grille		each					
	Acoustical transfer louvers		each					
	Louvers with wms, 1sf		each					

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			Quan.	Unit	Material Cost	Material Extension	Labor Cost	Labor Extension	Total M & L
	Dampers at grilles			each					
	Sub total								
23 4100	**Particulate Air Filtration**		Included in units						
23 7432	**Packaged Rooftop Units**								
	Roof top units								
	RTU-1	6,000 cfm dx		each					
	RTU-1-	3,000 cfm dx		each					
	RTU-3	3,500 cfm dx		each					
		Crane		ls					
		Electric connections		ls					
		Natural gas, piping connections		ls					
	Sub total								
23 7435	**Surgery Room Air Conditioning Unit**		See Roof top units						
23 8126	**Variable Refrigerant Flow Zoning Split System**								
	Split system								
		Condenser sections, rooftop							
	ACC-1			each					
	ACC-2			each					
		Evaporator sections, interior							
	AC-2, 3, 4			each					
	AC-1, 5 , 6			each					
	AC-7			each					
		Crane		ls					
		Electric connections		ls					
		Piping connections		ls					
	Sub total								
23 8200	**Heating Terminal Units**		See electrical						
23 8220	**Air Curtains**		Included in units						

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
260000	***ELECTRICAL***							
260500	**Common Work Results for Electrical**							
	Service							
	Electrical							
	Tap		each					
	Telephone							
	Tap		each					
	Equipment							
	Emergency generator							
	Reuse existing		each					
	Electric unit heaters							
	UH-1 - 3, CH-1 14.4amp		each					
	UH-4 36amp		each					
	FPT-1 3kw		each					
	Sub total							
260519	**Low Voltage Electrical Power Conductors and Cables**							
	Feeders							
	Air cleaning							
	Electric air cleaner		each					
	2 - (3)350kcmil+(1)350kcmil +#1awg g, 3" conduit, ug		lf					
	2 - (3)350kcmil+(1)350kcmil +#1awg g, 3" conduit		lf					
	4#1+1#6g, 2" c, ug		lf					
	4#3+1#6g, 2" c		lf					
	4#4/0+1#1g, 2 1/2" c		lf					
	3#2+1#6g, 1 1/22" c		lf					
	4#1+1#6g, 1 1/2" c		lf					
	2#8 +3/4" c		lf					
	Heat trace							
	General		ls					
	Gutter		lf					
	Ice melt pads		sf					
	Sub total							
260526	**Grounding and Bonding for Electrical Systems**	See systems						
260529	**Hangers and Supports for Electrical Systems**	See systems						

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
260533	**Raceway and Boxes for Electrical Systems**	See systems						
260548	**Vibration and Seismic Control for Electrical Systems**	See systems						
260553	**Identification for Electrical Systems**	See systems						
260800	**Commissioning of Electrical**		ls					
	Sub total							
260923	**Lighting Control Devices**							
	Branch Circuit							
	Switches		each					
	Occupancy sensor with switch							
	Wall mounted		each					
	Photocell controller		each					
	Sub total							
262200	**Low Voltage Transformers**							
	Transformer		each					
	Sub total							
262416	**Panelboards**							
	Panels							
	Main distribution panel, 600a		each					
	Lighting/power, 225a each		each					
	Sub total							
262417	**Selection of Overcurrent Devices**	See systems						
262500	**Roof Snow Melting System**	See systems						
262713	**Electricity Metering**							
	Electric meter rig		each					
	Sub total							
262726	**Wiring Devices**							
	Receptacles							
	Simplex GFI weatherproof		each					
	Duplex		each					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Duplex GFI		each					
	Duplex GFI weatherproof		each					
	Quad		each					
	Floor mounted quad GFI weatherproof		each					
	Astronomical clock for outdoor lighting		each					
	Kitchen connections	See conduit and wire						
	Raceway with outlets		lf					
	Backboxes		each					
	Branch circuit conduit and wire							
	Conduit assorted, including elbows, connectors, couplings and straps		lf					
	Wire assorted		lf					
	Junction boxes		each					
	Grounding		ls					
	Junction box for actuators for operable louvers		each					
	Junction box		each					
	Motor connections		each					
	Sub total							
262813	**Fuses**							
	Fco		each					
	Sub total							
262816	**Enclosed Switches**							
	Combination starter and fused disconnect switch, waterproof		each					
	Sub total							
263600	**Automatic Transfer Switches**							
	Service disconnect switch, 600a		each					
	Transfer switch ats							
	30amp		each					
	200amp		each					
	Sub total							

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			Quan.	Unit	Material		Labor		Total M & L
					Cost	Extension	Cost	Extension	
265000	**Architectural Lighting**								
	Lighting fixtures								
	Interior	Cellar		each					
	Exit								
		Wall		each					
		Ceiling		each					
		Ceiling double sided		each					
	L1	Cable mounted switched and dimmeable T8 linear fluorescent direct/indirect pendant,3 lamp		each					
	L1A	"		each					
	L1B	"		each					
	L1C	"		each					
	L1E	"		each					
	L1F	"		each					
	L1G	"		each					
	L1H	"		each					
	L2	Cable mounted fluorescent direct/indirect pendant,1 lamp		each					
	L3	Cable mounted fluorescent direct/indirect pendant,2 lamp		each					
	L3A	"		each					
	L4	Cable mountedfluorescent direct/indirect pendant,4 lamp		each					
	L4A	"		each					
	L5	Cable mounted fluorescent sealed pendant,2 lamp		each					
	L6	Surface mounted fluorescent vanity light		each					
	L7	Recessed exterior rated downlight		each					
	L8	Standalone led adjustable desk lamp		each					
	L9	Surface mounted linear undercabinet		each					
	EM	Emergency battery pack with hot wire to energize battery charger		each					
	Exterior								
	LX-1, LX	Pole mounted, including metal halide fixture and 14' pole		each					
	LX-2	Wall mounted compact fluorescent above doors		each					
	LX-3	LED bollard		each					
	Extra materials								
		Lamps		each					
		Diffusers, lenses, louvers and cones		each					
		Ballasts, fluorescent, hid		each					
		Miscellaneous		ls					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Lighting outlets		each					
	Fixture tails		each					
	Lighting fixtures conduit and wire							
	Conduit assorted, including elbows, connectors, couplings and straps		lf					
	Wire assorted		lf					
	Junction boxes		each					
	Grounding		ls					
	Sub total							
280000	***ELECTRONIC SAFETY AND SECURITY***							
280800	**Commissioning of Electronic Safety and Security**		ls					
	Sub total							
283100	**Fire Alarm System**							
	Fire alarm control panel		each					
	Devices							
	Manual fire alarm actuating device		each					
	Horn and strobe		each					
	Strobe		each					
	Ceiling mounted smoke detector		each					
	Duct mounted smoke detector		each					
	Ceiling mounted CO detector		each					
	Water flow switch		each					
	Tamper switch		each					
	10" bell		each					
	Outlets		each					
	Conduit		lf					
	Wire		lf					
	Fire alarm							
	Equipment							
	Flow switch		each					
FCO	Fused cut out		each					
	Dedicated telephone line to central monitoring		each					
	Panels							
FACP	Fire alarm control panel		each					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	FARA Fire alarm annunciator panel		each					
	Devices							
	Manual pull station		each					
	Strobe		each					
	Horn strobe		each					
	10" exterior bell		each					
	Detectors							
	Smoke, ceiling		each					
	Smoke, duct		each					
	Outlets		each					
	Conduits		lf					
	Wire		lf					
	Data/telephone system							
	Combination telephone/data floor outlets		each					
	Combination telephone/data wall outlets		each					
	3/4" conduit with pull line		lf					
	Equipment and cable/wire							
	CCTV system							
	Outlets		each					
	3/4" conduit with pull line		lf					
	Equipment and cable/wire							
	Rack		each					
	Recorder		each					
	Monitors		each					
	Work station with software		each					
	Cameras, fixed		each					
	Cable/wire		lf					
	Access control system							
	Card reader		each					
	Exit alarm with sounding device		each					
	System power supply		each					
	Doorbell from front entry		each					
	Buzzer to front entry		each					
	Intrusion alarm system							
	Detectors		each					

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		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Alarm device		each					
	Main panel with keypad		each					
	Remote keypad		each					
	Sub total							
310000	***EARTHWORK***							
312000	**Earthwork**							
	Erosion control							
	Silt fence		lf					
	Erosion and sediment control barrier		lf					
	Gravel construction entrance		sf					
	Inlet protection		each					
	Earthwork							
	General excavation							
	Slab area		cy					
	Footing/foundation wall		cy					
	Footing and foundation access		cy					
	Sub total							
320000	***EXTERIOR IMPROVEMENTS***							
321000	**Bases, Ballasts and Paving**							
	Gravel/sand base buy, haul, place, compact		cy					
	Backfill, compacted		cy					
	Borrow fill buy, load, haul, place, compact							
	Topsoil		cy					
	Disposal		cy					
	Line & grade		ls					
	Site preparation							
	General grading		sf					
	Fine grading		sf					
	Regrading, cut/fill/balance, uon		sf					
	Landscape retaining walls							
	No footing		lf					
	Footing		lf					
	Sub total							

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				Cost	Extension	Cost	Extension	
321223	**Imprinted Asphalt and Asphalt Coatings**							
	Exterior dog run, light colored non textured coated asphalt		sf					
	Street							
	On site		sf					
	Public		sf					
	Street repair		ls					
	Sub total							
321313	**Concrete Walks and Curbs**							
	Concrete walkways		sf					
	Wheelchair and access ramps, pedestrian ramps		each					
	Sub total							
321413	**Precast Concrete Pavers**							
	Precast pavers		sf					
	Sidewalk repair		ls					
	Pads							
	Generator pad, complete		sf					
	Curbs and gutters							
	Pre cast concrete		lf					
	Steel faced		lf					
	Sub total							
323119	**Ornamental Fencing**							
	Fences							
	Dog run		sf					
	Dog cage		sf					
	General		sf					
	Gates							
	Dog run gate		each					
	Dog cage gate		each					
	Pedestrian gate		each					
	Sub total							

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NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
323132	**Sliding Gate Operators**							
	Rolling							
	20'		each					
	Parking lines		lf					
	Pavement markings							
	Directional arrows, 8' typical		each					
	No park hatching		sf					
	Stop lines		each					
	Relocated sheds		each					
	Bike rack		each					
	Bench		each					
	Sub total							
329200	**Turf and Grasses**							
	W Wildflower and grass mixture							
	Seed		sf					
	Perennials		sf					
	Sub total							
329300	**Plants**							
	Street trees to remain, protect		each					
	Red twig dogwood		each					
	Summersweet		each					
	Yellow wood		each					
	Red cedar		each					
	Sub total							
033000	***UTILITIES***							
333000	**Internal Storm and Sanitary Drainage**							
	Site engineering							
	Fire protection							
	Water service connection(s) for fire suppression system, including piping and backfill, uon	Incleded						
	Plumbing							
	Water service connection for potable water system		each					

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NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
	Piping							
	2"		lf					
	Natural gas service connection		each					
	Piping		lf					
	Electrical							
	Power							
	Trench including excavation, disposal and backfill and conuit and cable	See feeders						
	Electrical service connection		each					
	Refurbish existing manhole		each					
	3" sleeves		each					
	Generator							
	Trench including excavation, disposal and backfill and conuit and cable	See feeders						
	Ats connection		each					
	2" sleeve		each					
	Telephone/data							
	Trench including excavation, disposal and backfill		lf					
	Telephone/data service connections		each					
	End box, 3' - 6"l x 2' - 7"w x 2' - 0" d		each					
	3" sleeves		each					
	3" conduit		lf					
	Cable/wire		lf					
	Internal Storm and Sanitary Drainage							
	Temporary cleanout		each					
	Yard drain		each					
	Catch basin, type 2		each					
	Storm water service connection to combined sewer, including piping and backfill, uon	See sanitary service connection						
	Sanitary service connection		each					
	Piping							
	6"		lf					
	8"		lf					
	10"		lf					
	Sub total							

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NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: Staten Island Animal Care and Control Center
Location: 3139 Veterans Road West, Staten Island NY 10309
Bidder: _____

DDC ID: HI82SIABE
Sponsor Agency: DOHMH

		Quan.	Unit	Material		Labor		Total M & L
				Cost	Extension	Cost	Extension	
334000	**Storm Drainage Utilities**							
	Storm water detention							
	In ground drywalls, 10' diameter, 11' deep, complete, including excavation, disposal and backfill		each					
	Sub total							
TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK								

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PLA PROJECT

ATTACHMENT 1 - BID INFORMATION
PROJECT ID: HL82SIABE

DESCRIPTION AND LOCATION OF WORK:

Staten Island Animal Care and Control Center Reconstruction
3139 Veterans Road West
Staten Island, NY 10309
E-PIN: 85013B0051 / DDC PIN: 8502013HL0001C

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, APRIL 10, 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, APRIL 10, 2013 @ 2:00 PM**
	LATE BIDS WILL NOT BE ACCEPTED

PRE-BID CONFERENCE:

PLACE	**Staten Island Animal Care and Control Center** **3139 Veterans Road West** **Staten Island, NY 10309**
DATE AND HOUR	**TUESDAY, MARCH 26, 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	INTRASTATE RATE	INTERSTATE RATE
_____	_____	_____
_____	_____	_____
_____	_____	_____

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.

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

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

(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: _____
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.

Mayor's Office of Contract Services

	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

Mayor's Office of Contract Services

- 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.

Mayor's Office of Contract Services

	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

Mayor's Office of Contract Services

- 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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NYC Small Business Services | Division of Labor Services

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. Would your company like information on how to certify with the City of New York as a:

_____ Minority Owned Business Enterprise _____ Locally based Business Enterprise

_____ Women Owned Business Enterprise _____ Emerging Business Enterprise

_____ Disadvantaged

3. Please indicate if you would like assistance from SBS in identify 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.

6. _____
Company Name

7. _____ Street Address _____ City _____ State _____ Zip Code

8. _____ (Chief Operating Officer) First Name _____ Last Name _____ Telephone Number _____ Fax Number

9. _____ Designated Equal Opportunity Compliance Officer (if same as Item #8, write "Same") _____ Telephone Number

10. _____
Name of Prime Contractor and Contact Person (if same as item #6, write "Same")

11. Number of employees in your company: _____

12. Contract information:

(a) _____ Contracting Agency (City Agency)

(b) _____ Contract Amount

(c) _____ Procurement Identification Number (PIN)

(d) _____ Contract Registration Number (CT#)

(e) _____ Project Commence Date

(f) _____ Projected Completion Date

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(g) 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 the 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 the 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: First Name _____ Last Name _____

    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 24 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.

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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:

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(a) Prior to the 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 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 compliant pursuant to an intern 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 you firm, within the past three years, been named as a defendant (or respondent) in nay 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 qualification? 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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NYC Small Business Services | Division of Labor Services

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

1. Do you plan to subcontractor work on this contract? *Yes*___ *No*___

2. If *yes*, complete the chart below.

NOTE: All proposed subcontractors with a subcontract in excess of $1,000,000 must complete an Employment Report for review and approval before the contract may be awarded and work commences.

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

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

Ownership codes: **W**: White **A**: Asian **B**: Black **N**: Native American **H**: Hispanic **F**: Female

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FORM B: PROJECTED WORKFORCE

TRADE CLASSIFICATION CODES

(J) Journey level Workers
(A) Apprentice
(H) Helper
(TRN) Trainee
(TOT) Total by Column

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

Trade: _____

Union Affiliation, if applicable:

_____

Total (Col. #1-10):

_____

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

_____

Total Female
(Col. #6 – 10):

_____

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

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

_____

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FORM B: PROJECTED WORKFORCE
TRADE CLASSIFICATION CODES

(J) Journey level Workers
(H) Helper
(TOT) Total by Column
(A) Apprentice
(TRN) Trainee

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

Trade: _____

Union Affiliation, if applicable:

_____

Total (Col. #1-10):

_____

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

_____

Total Female
(Col. #6 – 10):

_____

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

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

_____

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NYC Small Business Services

Division of Labor Services

FORM C: CURRENT WORKFORCE
TRADE CLASSIFICATION CODES

(J) Journey level Workers
(H) Helper
(TOT) Total by Column
(A) Apprentice
(TRN) Trainee

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

Trade: _____

Union Affiliation, if applicable:

_____

Total (Col. #1-10):

_____

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

_____

Total Female
(Col. #6 – 10):

_____

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

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

_____

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Division of Labor Services

FORM C: CURRENT WORKFORCE

TRADE CLASSIFICATION CODES

(J) Journey level Workers
(H) Helper
(TOT) Total by Column
(A) Apprentice
(TRN) Trainee

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

Trade: _____

Union Affiliation, if applicable:

_____

Total (Col. #1-10):

_____

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

_____

Total Female
(Col. #6 – 10):

_____

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

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

_____

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NYC Small Business Services | Division of Labor Services

Date _____ File Number _____

LESS THAN $750,000 SUBCONTRACT CERTIFICATE

Are you currently certified as one of the following? Please check yes or no:

M/WBE *Yes* ___ *No* ___ **MBE** *Yes* ___ *No* ___
WBE *Yes* ___ *No* ___ **LBE** *Yes* ___ *No* ___

If you are certified as an **M/WBE, MBE, WBE,** or **LBE,** what city/state agency are you certified with? _____

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**

_____
Company Name *Employer Identification Number or Federal Tax I.D*

_____
Company Address and Zip Code

_____/_____
Contact Person (First Name, Last Name) *Telephone Number*

_____/_____
Fax Number *E-mail Address*

_____
Contracting Agency

Description and location of proposed subcontract:

_____
_____

_____ _____ _____ _____
Borough *Project Number* *Pin Number* *Contract Amount*

I, (print name of authorized official signing)_____ hereby certify that I am authorized by the above-named subcontractor to certify that said subcontractor's proposed contract with the above named owner or City agency is less than $750,000.

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/and or criminal prosecution.

_____
Signature of authorized official Date

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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 requirement for the contractors and subcontractors working on this construction project. 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/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.

Please attach your M/WBE Compliance Report.

Only original signatures accepted.

Sworn to before me this _____ day of _____ 20 _____

_____

Authorized Signature

_____

Notary Public

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WHO MUST FILE AN EMPLOYMENT REPORT

An Employment Report (ER) must be filed if you meet the following conditions:

CONTRACTOR	CONTRACT VALUE	Submission Requirement
Prime Contractor	$1,000,000 or greater (*city, state*)	Construction Employment Report
	$10,000 or greater (***federally and/or federally assisted***)	
Subcontractor	$750,000 or greater	Construction Employment Report
	Less than $750,000	Less than $750,000 Certificate
	$10,000 or greater (***federally and/or federally assisted***)	Construction Employment Report

WHERE TO FILE

ERs must be filed directly with the Division of Labor Services (DLS).

DLS REVIEW PROCESS

In accordance with Executive Order 50 (EO 50), upon receipt by DLS of a completed ER, DLS conducts a review of the contractor's current employment policies, practices and procedures, as well as perform a statistical analysis of the contractor's workforce, if necessary. The process is as follows:

1. Within five (5) business days, DLS will review the ER for completeness and accuracy. If any information is omitted or incorrect, or if necessary documents are not submitted, the submission shall be deemed incomplete and DLS will inform the contractor. The substantive compliance review does not commence until the submission is complete. **An incomplete submission will delay the review process and may preclude or interrupt the contract approval.**

1a. If the City is allocating funds to this project, you must provide the name of the contracting agency.

2. If the ER submission is complete, the compliance review will proceed, resulting in one of the following:

Certificate of Approval
The contractor is found to be in compliance with all applicable laws and regulations. The approval is valid for 36 months.

Continued Approval Certificate
The contractor has been issued a Certificate of Approval in the previous 36 months which is good for the applicable contract.

Conditional Certificate of Compliance

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The contractor is required to take corrective actions in order to be in compliance with EO 50. The contractor must meet the conditions within three months of the issue of the Conditional Certificate.

Determination of Nonperformance

The contractor has failed to take the required corrective actions stipulated in the Conditional Certificate. A determination of nonperformance may prevent a contractor from receiving an DLS Approval.

3. Please indicate if you would like assistance from SBS in identifying certified M/WBEs for contracting opportunities.

3a. Please provide a copy of your project labor agreement which is negotiated through an employer trade association.

HOW TO COMPLETE THE EMPLOYMENT REPORT

Contents

General Information
Part I: Company/Contract Information
Part II: Employment Policies and Practices
Part III: Contract Bid Information and Projected and Current Workforce Forms
Signature Page

PART I:CONTRACTOR/SUBCONTRACTOR INFORMATION

Question 5: Please provide the Employer Identification Number or Federal Tax I.D.

Questions 6 – 9: Please provide the requested company information. All contracts must have a designated Equal Employment Officer.

Question 10: If you are a subcontractor, you must state the name of the contractor for whom you are providing the construction services.

Question 11: Please indicate how many employees are in your company.

Question 12 (a-f): Please provide all relevant information requested in 12 (a) to (f).

Question 12(g): Provide a description of the trade work you will perform on this project and the address where the work will be performed. Subcontractors can obtain this information from the contract they have with their contractor.

Questions 13 – 15: If your company has received a valid Certificate of Approval within the past 36 months, been audited by the United States Department of Labor, Office of Federal Contract Compliance Programs (OFCCP), or if your company has submitted an ER for a different contract for which you have not yet received a compliance certificate, then you only need to complete and submit the following:

- General Information section
- Part I - Contractor/Subcontractor Information
- Form B - Projected Workforce
- Signature Page

If your company is currently waiting for an approval on another contract previously submitted, be certain to identify the date on which you submitted the completed Employment Report, the name of the City contracting agency with which the contract was made, and the name and telephone number of the person to whom the Employment Report was submitted.

If your company was issued a Conditional Certificate of Approval, all required corrective actions must have been taken or DLS will not issue a Continued Certificate.

Question 16: If the company was audited by the OFCCP, also provide the following:

- Identify the reviewing OFCCP office by its name and address
- If an unconditional certificate of compliance was issued by the OFCCP, attach a copy of the certificate in lieu of completing Parts II and III;

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- Include copies of all corrective actions and documentation of OFCCP's performance; and
- Provide a copy of all stated OFCCP findings.

Question 17: Please provide a copy of any Collective Bargaining Agreement(s) which is negotiated through an employer trade association on behalf of your organization or any of its affiliates.

PART II: EMPLOYMENT POLICIES AND PRACTICES

Remember to label all documents with the question number for which they are submitted.

Questions 18a – j: You must respond to the questions as to whether or not your firm has documents reflecting written policies, benefits and procedures. If so, then you must identify by name each document in which the policy(ies), procedure(s) and benefit(s) is located and submit copies of all of the document(s). If your firm follows unwritten practices or procedures, include an explanation of how they operate. Please submit the most current document(s), including all applicable amendments. Label each document and/or unwritten practice according to the question to which it corresponds (e.g. 18a, 18b, etc.)

Questions 19a – h: Inquires about the manner/methods by which you comply with the requirements of the Immigration Reform and Control Act of 1986 (IRCA).

Question 20: Inquires into where and how I-9 forms are maintained and stored.

Questions 21a – e: Inquires into whether or not there is a requirement that an applicant or employee be subjected to a medical examination at any given time. Copes of the medical information questionnaire and instructions must be submitted with the Employment Report.

Question 22: Indicate the existence and location of all statements of your firm's Equal Employment Opportunity policy and attach a copy of each statement.

Question 23: Submit any current Affirmative Action Plan(s) created pursuant to Executive Order 11246.

Question 24: If your firm or collective bargaining agreement has an internal grievance procedure, indicate this and submit a copy of the policy and procedure. If unwritten, explain its nature and operation. Explain how your firm's procedure addresses EEO complaints.

Question 25: If your employees have used the procedure in the last three (3) years, please submit an explanation in the format indicated below:

1. Number of complaint(s)	2. Nature of the complaint(s)	3. Position(s) of the complainant(s)	4. Was an investigation conducted? Y/N	5. Current status of the disposition

Question 26: Indicate whether in the past three (3) years complaints have been filed with a court of law or administrative agency, naming your company as a defendant (or respondent) in a complaint alleging violation of any anti-discrimination or affirmative action laws. If yes, develop and submit a log to show, for each administrative/and or judicial action filed, the following information:

1. Name(s) of complainant(s)	2. Administrative agency or court in which action was filed	3. Nature of the complaint(s)	4. Current status	5. If not pending, the complaint's disposition

Question 27: Identify each job for which a physical qualification exists. Identify and explain the physical qualification(s) for each stated job. Submit job descriptions for each job and the reasons for the qualifications.

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Question 28: Identify each job for which there exists any qualification related to age, race, color, national origin, sex, creed, disability, marital status, sexual orientation or citizenship status. Identify and explain the specific related qualification for each job stated. Submit job descriptions for each job and the reasons for the qualifications.

PART III: CONTRACT BID INFORMATION AND PROJECTED AND CURRENT WORKFORCE FORMS

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

Your projections for the utilization of subcontractors on the proposed contract are to be provided in this section. A chart has been provided for the identification of subcontractors. Information is to be provided to the extent known at the time the ER is filed for review by DLS. If the subcontractor's name is unknown, then write "unknown". Under "ownership", enter the appropriate race/ethnic and gender code. If the contract is federally funded or assisted and the subcontractor is being utilized in accordance with applicable federal requirements with respect to Minority Business Enterprise or Woman Business Enterprise requirements, enter the appropriate code. This will also apply to state funded contracts with similar requirements for minority and female owned businesses.

FORM B: PROJECTED WORKFORCE FOR WORK TO BE PERFORMED ON THIS PROJECT

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

FORM C: CURRENT WORKFORCE FOR WORK TO BE PERFORMED ON THIS PROJECT

For each trade *currently* engaged by your company for all work performed in NYC, enter the current workforce for Males and Females by trade classification in the charts provided.

SIGNATURE PAGE

The signatory of this Employment Report and all other documents submitted to DLS must be an official authorized to enter into a binding legal agreement. The signature page must be completed in its entirety and notarized. Only original signatures will be accepted.

FOR OFFICIAL USE ONLY. File No. _____

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Phone: (212) 513 – 6323 Fax: (212) 618 – 8879

FMS ID: **HL82SIABE**

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

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

Staten Island Animal Care and Control Center Reconstruction

LOCATION: **3139 Veterans Road West**
BOROUGH: **Staten Island 10309**
CITY OF NEW YORK

Contractor

Dated _____, 20____

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____, 20____

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

PROJECT ID: HL82SIABE LAW

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

Staten Island Animal Care and Control Center Reconstruction

LOCATION: 3139 Veterans Road West
BOROUGH: Staten Island 10309
CITY OF NEW YORK

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

Department of Health & Mental Hygiene

Garrison Architects

Date: January 8, 2013

3-004

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 trusteed 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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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;

(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

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

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;

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

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

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

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

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,

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

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 trusteed 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 trusteed 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 trusteed Trust Agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of, such Trust Funds but only with regard to Program Work done under this Agreement and only for those employees to whom this Agreement

requires such benefit payments.

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

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

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 of 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

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.

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.

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

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.

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 pr 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 be considered part of this contract. The quantities actually required to complete the contract work may be less or more than so estimated, and if so, no action for damages or for loss of profits shall accrue to the contractor by reason thereof.

(C) Overruns: The terms and conditions applicable to overruns of unit price items are set forth in Article 26 of the Contract.

34. Excise Tax

Bidders are referred to the Specifications for information on Federal Excise Tax exemptions.

35. Licenses and Permits

The successful bidder will be required to obtain all necessary licenses and permits necessary to perform the work.

36. Multiple Prime Contractors

If more than one prime contractor will be involved on this project, all contractors are required to examine the Invitation for Bid packages for all other parts of the project.

37. Locally Based Enterprise Requirements (LBE)

This Contract is subject to the requirements of Administrative Code, Section 6-108.1, and the regulations promulgated thereunder. No construction contract will be awarded unless and until these requirements have been complied with in their entirety. The bidder is advised of the provisions set forth below, as well as the provisions with respect to the Locally Based Enterprise Program contained in Article 67 of the Contract. The contractor is advised that:

(A) If any portion of the Contract is subcontracted, not less than ten percent of the total dollar amount of the contract shall be awarded to locally based enterprises ("LBEs"); except, where less than ten percent of the total dollar amount of the Contract is subcontracted, such lesser percentage shall be so awarded.

(B) No contractor shall require performance and payment bonds from LBE subcontractors.

(C) No Contract shall be awarded unless the contractor first identifies in its bid:

(1) the percentage, dollar amount and type of work to be subcontracted; and
(2) the percentage, dollar amount and type of work to be subcontracted to LBEs.

(D) Within ten calendar days after notification of low bid, the apparent low bidder shall submit an "LBE Participation Schedule" to the contracting agency. If such schedule does not identify sufficient LBE subcontractors to meet the requirements of Administrative Code Section 6-108.1, the apparent low bidder shall submit documentation of its good faith efforts to meet such requirements.

(1) The "LBE Participation Schedule" shall include:

(a) the name and address of each LBE that will be given a subcontract,
(b) the percentage, dollar amount and type of work to be subcontracted to the LBE, and
(c) the dates when the LBE subcontract work will commence and end.

(2) The following documents shall be attached to the "LBE Participation Schedule":

(a) verification letters from each subcontractor listed in the "LBE Participation Schedule" stating that the LBE will enter into a formal agreement for work,
(b) certification documents of any proposed LBE subcontractor which is not on the LBE certified list, and
(c) copies of the certification letter of any proposed subcontractor which is an LBE.

(3) Documentation of good faith efforts to achieve the required LBE percentage shall include as appropriate but not limited to the following:

(a) attendance at prebid meetings, when scheduled by the agency, to advise bidders of contract requirements;
(b) advertisement where appropriate in general circulation media, trade association publications and small business media of the specific subcontracts that would be at least equal to the percentage goal for LBE utilization specified by the contractor;
(c) written notification to association of small, minority and women contractors soliciting specific subcontractors;
(d) written notification by certified mail to LBE firms that their interest in the contract is solicited for specific work items and their estimated values;
(e) demonstration of efforts made to select portions of the work for performance by LBE firms in order to increase the likelihood of achieving the stated goal;
(f) documented efforts to negotiate with LBE firms for specific subcontracts, including at a minimum:
(i) The names, address and telephone numbers of LBE firms that are contacted;
(ii) A description of the information provided to LBE firms regarding the plans and specifications for portions of the work to be performed;
(iii) Documentation showing that no reasonable price can be obtained from LBE firms;
(iv) A statement of why agreements with LBE firms were not reached;
(g) a statement of the reason for rejecting any LBE firm which the contractor deemed to be unqualified; and
(h) documentation of efforts made to assist the LBE firms contacted that needed assistance in obtaining required insurance.

(E) Unless otherwise waived by the Commissioner with the approval of the Office of Economic and Financial Opportunity, failure of a proposed contractor to provide the information required by paragraphs (C) and (D) above may render the bid non-responsive and the Contract may not be awarded to the bidder. If the contractor states that it will subcontract a specific portion of the work, but can demonstrate despite good faith efforts it cannot achieve its required LBE percentage for subcontracted work until after award of Contract, the Contract may be awarded, subject to a letter of compliance from the contractor stating that it will comply with Administrative Code Section 6-108.1 and subject to approval by the Commissioner. If the contractor has not met its required LBE percentage prior to award, the contractor shall demonstrate that a good faith effort has been made subsequent to award to obtain LBEs on each subcontract until its meets the required percentage.

(F) When a bidder indicates prior to award that no work will be subcontracted, no work may be subcontracted without the prior written approval of the Commissioner, which shall be granted only if the contractor in good faith seeks LBE subcontractors at least six weeks prior to the start of work.

(G) The contractor may not substitute or change any LBE which was identified prior to award of the contract without the written permission of the Commissioner. The contractor shall make a written application to the Commissioner for permission to make such substitution or change, explaining why the contractor needs to change its LBE subcontractor and how the contractor will meet its LBE subcontracting requirement. Copies of such application must be served on the originally identified LBE by certified mail return receipt requested, as well as the proposed substitute LBE. The Commissioner shall determine whether or not to grant the contractor's request for substitution.

38. Bid Submission Requirements

The Bid Submission Requirements are set forth 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 sub-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) x (HP rating) x (Fuel cost/gallon). Reasonable rental value is defined as the lower of either seventy-five percent of the monthly prorated rental rates established in "The AED Green Book, Rental Rates and Specifications for Construction Equipment" published by 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) x (HP rating) x (Fuel cost/gallon). In lieu of renting, the City reserves the right to direct the purchase of non-operating equipment (scaffolding, sheeting systems, road plates, etc.), with payment on a purchase-salvage/life cycle basis, if less than the projected rental costs; plus

26.2.7 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 asses, identify and actively recruit employees from under-represented religious groups with potential for further advancement; and

69.3.1(i) appoint a senior management staff member to oversee affirmative 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 2 and 0.

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.

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 SUBCONTRCTING 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.

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

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: five million Dollars, ($ 5,930,000.00), 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**.
nine hundred thirty thousand dollars

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.

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.

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: Minelli Construction Co., Inc.

By: _____
(Member of Firm or Officer of Corporation)

Title: V.P

(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 2 day of October, before me personally came Joseph Spano to me known, who, being by me duly sworn did depose and say that he resides at St James that he is the V.P. 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.

CAROLE FASANO
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01FA4894012
Qualified in Suffolk County
Commission Expires May 11, 2015

Carole Fasano
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 3rd day of October 2013 before me personally came David Resnick 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
Commission Expires July 15, 2017

AUTHORITY

MAYOR'S CERTIFICATE NO. CBX DATED
BUDGET DIRECTOR'S CERTIFICATE NO. DATED

APPROPRIATION
COMMISSIONER'S CERTIFICATE

In conformity with the provisions of Section 6-101of 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

Five million nine hundred thirty thousand dollars

Dollars ($ 5,930,000.00)

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.

_____
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

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

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

Minelli Construction Co., Inc.
300 Corporate Plaza
Islandia, NY 11749

hereinafter referred to as the "Principal", and _____

Fidelity and Deposit Company of Maryland
300 Interpace Parkway, Bldg. B/C
Parsippany, NJ 07054

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

Five Million Nine Hundred Thirty Thousand and 00/100 ---Dollars

($ 5,930,000.00) 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

Staten Island Animal Care & Control Center Reconstruction
Project ID: HL82SIABE

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.

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.

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 26 day of September, 2013.

(Seal) Minelli Construction Co., Inc. (L.S.)
Principal
By: _____

(Seal) Fidelity and Deposit Company of Maryland
Surety
By: Marnie Ginsburg
Marnie Ginsburg, Attorney-in-Fact

(Seal) _____
Surety
By: _____

(Seal) _____
Surety
By: _____

(Seal) _____
Surety
By: _____

(Seal) _____
Surety

Bond Premium Rate $100m @ 11.50/ $400m @ 9.20/ $2mm @ 8.05/ $2.5mm @ 6.90/ $930m @ 5.75
Surcharge 1/2 Percent per month after 12 months

Bond Premium Cost $44,398.00

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by 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 New York County of Suffolk ss:

On this 1st day of Oct., 20 13 before me personally came Joseph Spano to me known, who, being by me duly sworn did depose and say that he/she resides at St. James, New York; that he/she is the Vice Pres 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.

Carole Fasano

Notary Public or Commissioner of Deeds

CAROLE FASANO
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01FA4894012
Qualified in Suffolk County
Commission Expires May 11, 2015

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.

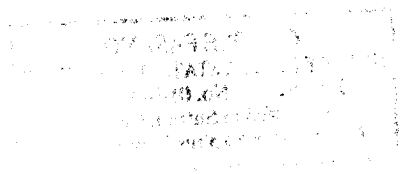
_____

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.



Surety Acknowledgment

State of **New York**

County of **Nassau**

On the 26th day of **September, 2013** personally came **Marnie Ginsburg** to me known , who being by me duly sworn did depose and say that he/she is an Attorney-in-Fact of **Fidelity and Deposit Company of Maryland** in and which executed the above Instrument know(s) the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he/she/they signed the 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 resolution thereof.

TARA LAVERDIERE
Notary Public, State of New York
No. 01LA6076587
Qualified in Nassau County
Commission Expires 6/24/2014

My commission expires _____

Notary Public

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **THOMAS O. MCCLELLAN, Vice President,** in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Louis J. SPINA, Denese THOMPSON, Philip G. SAMUEL, Frank ABBATIELLO, Kim SPINELLO, Tara LAVERDIERE and Marnie GINSBURG, all of Uniondale, New York, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 19th day of July, A.D. 2013.

ATTEST:

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: _____
Assistant Secretary
Eric D. Barnes

_____
Vice President
Thomas O. McClellan

State of Maryland
City of Baltimore

On this 19th day of July, A.D. 2013, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **THOMAS O. MCCLELLAN, Vice President, and ERIC D. BARNES, Assistant Secretary,** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

_____
Constance A. Dunn, Notary Public
My Commission Expires: July 14, 2015

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 26 day of September, 2013.

Geoffrey Delisio

Geoffrey Delisio, Vice President

FIDELITY AND DEPOSIT COMPANY

OF MARYLAND
600 Red Brook Blvd., Suite 600, Owings Mills, MD 21117

Statement of Financial Condition
As Of December 31, 2012

ASSETS

Bonds		$ 157,177,826
Stocks		23,000,311
Cash and Short Term Investments		119,155
Reinsurance Recoverable		17,923,564
Other Accounts Receivable		35,473,256
TOTAL ADMITTED ASSETS		$ 233,694,113

LIABILITIES, SURPLUS AND OTHER FUNDS

Reserve for Taxes and Expenses		$ 74,782
Ceded Reinsurance Premiums Payable		48,323,524
Securities Lending Collateral Liability		1,716,240
TOTAL LIABILITIES		$ 50,114,546
Capital Stock, Paid Up	$ 5,000,000	
Surplus	178,579,567	
Surplus as regards Policyholders		183,579,567
TOTAL		$ 233,694,113

Securities carried at $59,468,002 in the above statement are deposited as required by law.

Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of December 31, 2012 market quotations for all bonds and stocks owned, the Company's total admitted assets would be $243,518,971 and surplus as regards policyholders $193,404,425.

I, DENNIS F. KERRIGAN, Corporate Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2012.

Corporate Secretary

State of Illinois
City of Schaumburg } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Illinois, in the City of Schaumburg, this 15th day of March, 2013.

Notary Public

OFFICIAL SEAL
DARRYL JOINER
Notary Public - State of Illinois
My Commission Expires May 3, 2014

Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we, Minelli Construction Co., Inc.
300 Corporate Plaza
Islandia, NY 11749

hereinafter referred to as the "Principal", and Fidelity and Deposit Company of Maryland
300 Interpace Parkway, Bldg. B/C
Parsippany, NJ 07054

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

Five Million Nine Hundred Thirty Thousand and 00/100 --- Dollars

($5,930,000.00) 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

Staten Island Animal Care & Control Center Reconstruction
Project ID: HL82SIABE

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.

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.

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 26th day of September, 2013.

(Seal) Minelli Construction Co., Inc. (L.S.)
Principal
By: _____

(Seal) Fidelity and Deposit Company of Maryland
Surety
By: Marnie Ginsburg
Marnie Ginsburg, 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.

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Suffolk ss:

On this 1st day of October, 2013 before me personally came Joseph Spano to me known, who, being by me duly sworn did depose and say that he resides at St James, NY that he is the Vice President of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

Carole Fasano

Notary Public or Commissioner of Deeds

CAROLE FASANO
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 01FA4894012
Qualified in Suffolk County
Commission Expires May 11, 2015

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

Surety Acknowledgment

State of **New York**

County of **Nassau**

On the 26th day of **September, 2013** personally came **Marnie Ginsburg** to me known , who being by me duly sworn did depose and say that he/she is an Attorney-in-Fact of **Fidelity and Deposit Company of Maryland** in and which executed the above Instrument know(s) the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he/she/they signed the 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 resolution thereof.

TARA LAVERDIERE
Notary Public, State of New York
No. 01LA6076587
Qualified in Nassau County
Commission Expires 6/24/2014

My commission expires _____

_____
Notary Public

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **THOMAS O. MCCLELLAN, Vice President,** in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Louis J. SPINA, Denese THOMPSON, Philip G. SAMUEL, Frank ABBATIELLO, Kim SPINELLO, Tara LAVERDIERE and Marnie GINSBURG, all of Uniondale, New York, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND,** this 19th day of July, A.D. 2013.

ATTEST:

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: _____
Assistant Secretary
Eric D. Barnes

_____
Vice President
Thomas O. McClellan

State of Maryland
City of Baltimore

On this 19th day of July, A.D. 2013, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **THOMAS O. MCCLELLAN, Vice President, and ERIC D. BARNES, Assistant Secretary,** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

_____
Constance A. Dunn, Notary Public
My Commission Expires: July 14, 2015

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 26 day of September, 2013.

Geoffrey Delisio

Geoffrey Delisio, Vice President

FIDELITY AND DEPOSIT COMPANY

OF MARYLAND
600 Red Brook Blvd., Suite 600, Owings Mills, MD 21117

Statement of Financial Condition
As Of December 31, 2012

ASSETS

Bonds		$ 157,177,826
Stocks		23,000,311
Cash and Short Term Investments		119,155
Reinsurance Recoverable		17,923,564
Other Accounts Receivable		35,473,256
TOTAL ADMITTED ASSETS		$ 233,694,113

LIABILITIES, SURPLUS AND OTHER FUNDS

Reserve for Taxes and Expenses		$ 74,782
Ceded Reinsurance Premiums Payable		48,323,524
Securities Lending Collateral Liability		1,716,240
TOTAL LIABILITIES		$ 50,114,546
Capital Stock, Paid Up	$ 5,000,000	
Surplus	178,579,567	
Surplus as regards Policyholders		183,579,567
TOTAL		$ 233,694,113

Securities carried at $59,468,002 in the above statement are deposited as required by law.

Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of December 31, 2012 market quotations for all bonds and stocks owned, the Company's total admitted assets would be $243,518,971 and surplus as regards policyholders $193,404,425.

I, DENNIS F. KERRIGAN, Corporate Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2012.

Corporate Secretary

State of Illinois
City of Schaumburg } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Illinois, in the City of Schaumburg, this 15th day of March, 2013.

Notary Public

OFFICIAL SEAL
DARRYL JOINER
Notary Public - State of Illinois
My Commission Expires May 3, 2014

<u>Performance Bond #1 (Pages 80 to 83)</u>: 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.

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.

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.

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

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.

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.

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

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

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.

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.

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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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. 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.

Pursuant to Labor Law §220 (3) 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.

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.

Prevailing Rate Schedule Information: The information below is intended to assist you in meeting your prevailing wage rate obligation.

Covered Workers: Any and all individuals who are engaged, employed or otherwise occupied as Workers, Laborers or Mechanics on the public work site.

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.

Wasyl Kinach, P.E.
Director of Classifications
Bureau of Labor Law

220 SCHEDULE OF PREVAILING WAGES AND SUPPLEMENTAL BENEFITS ADDENDUM
EFFECTIVE PERIOD JANUARY 1, 2013 THROUGH JUNE 30, 2013

List of Amended Classifications

1. BOILERMAKER
2. CEMENT MASON
3. DERRICKPERSON AND RIGGER
4. DRIVER: TRUCK (TEAMSTER)
5. ENGINEER - FIELD (BUILDING CONSTRUCTION)
6. ENGINEER - OPERATING
7. HEAT AND FROST INSULATOR
8. HOUSE WRECKER
9. IRON WORKER - ORNAMENTAL
10. IRON WORKER - STRUCTURAL
11. MASON TENDER
12. MASON TENDER (INTERIOR DEMOLITION WORKER)
13. MOSAIC MECHANIC
14. PAPERHANGER
15. PLASTERER
16. PLASTERER - TENDER
17. PLUMBER
18. PLUMBER (MECHNICAL EQUIPMENT AND SERVICE)
19. PLUMBER (RESIDENTIAL RATES FOR 1, 2 AND 3 FAMILY HOME CONSTRUCTION)
20. ROOFER

21. SHEET METAL WORKER

22. SIGN ERECTOR

23. STEAMFITTER

24. STEAMFITTER - REFRIGERATION AND AIR CONDITIONER

25. TILE FINISHER

26. TILE LAYER - SETTER

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ASBESTOS HANDLER
(Hazardous Material; Disturbs, removes, encapsulates, repairs, or encloses friable asbestos material)

Asbestos Handler

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $35.10
Supplemental Benefit Rate per Hour: $14.85

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)

BLASTER

Blaster

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $43.20
Supplemental Benefit Rate per Hour: $37.29

Blaster (Hydraulic)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $43.95

Supplemental Benefit Rate per Hour: $37.29

Blaster - Trac Drill Hydraulic

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $38.96
Supplemental Benefit Rate per Hour: $37.29

Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $38.24
Supplemental Benefit Rate per Hour: $37.29

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $37.29
Supplemental Benefit Rate per Hour: $37.29

Blaster - Powder Carriers

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $33.73
Supplemental Benefit Rate per Hour: $37.29

Blaster - Hydraulic Trac Drill Chuck Tender

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $32.57
Supplemental Benefit Rate per Hour: $37.29

Blaster - Chuck Tender & Nipper

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $31.88
Supplemental Benefit Rate per Hour: $37.29

Blaster - Magazine Keepers: (Watch Person)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $19.26
Supplemental Benefit Rate per Hour: $37.29

Overtime Description
For Blaster - Magazine Keepers: (Watch Person) only - time and one half the regular rate for work after an 8 hour day, Saturday, Sunday and holidays listed below.

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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $47.98
Supplemental Benefit Rate per Hour: $37.88
Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - $56.36; For double overtime - $74.86.

Effective Period: 1/1/2013 - 3/31/2013
Wage Rate per Hour: $49.47
Supplemental Benefit Rate per Hour: $39.48

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - $58.78; For double overtime - $78.07.

Effective Period: 4/1/2013 - 6/30/2013
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.

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $46.44
Supplemental Benefit Rate per Hour: $27.53

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
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: 7/1/2012 - 6/30/2013
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.

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

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $46.74
Supplemental Benefit Rate per Hour: $42.37

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day

Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
Off shift work, commencing between 5:00 P.M. and 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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $38.98
Supplemental Benefit Rate per Hour: $25.67
Supplemental Note: $28.42 on Saturdays; $31.17 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)

CEMENT MASON

Cement Mason

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $42.50
Supplemental Benefit Rate per Hour: $39.06
Supplemental Note: Overtime supplemental benefit rate per hour: $57.56

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $37.63
Supplemental Benefit Rate per Hour: $39.06
Supplemental Note: Overtime supplemental benefit rate per hour: $57.56

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
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.

(Local #780)

CORE DRILLER

Core Driller

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $35.44
Supplemental Benefit Rate per Hour: $19.75

Core Driller Helper

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $28.60
Supplemental Benefit Rate per Hour: $19.75

Core Driller Helper(Third year in the industry)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $25.74
Supplemental Benefit Rate per Hour: $19.75

Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $22.88
Supplemental Benefit Rate per Hour: $19.75

Core Driller Helper (First year in the industry)

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 12/31/2012
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.

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $41.00
Supplemental Benefit Rate per Hour: $46.07
Supplemental Note: The above supplemental rate applies for work performed in Manhattan, Bronx, Brooklyn and Queens. $47.49 - For work performed in Staten Island.

Derrick Person & Rigger - Site Work

For site work where no rigging is involved.

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $58.95
Supplemental Benefit Rate per Hour: $42.37

Diver Tender (Marine)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $42.10
Supplemental Benefit Rate per Hour: $42.37

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $46.74
Supplemental Benefit Rate per Hour: $42.37

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays

None

Shift Rates

Off shift work, commencing between 5:00 P.M. and 10:00 P.M., shall work eight and one half hours allowing for one half hour for lunch but will be paid the straight time hourly wage for 9 hours and the straight time supplemental benefits for 8 hours.

(Carpenters District Council)

DRIVER: TRUCK (TEAMSTER)

Driver - Automobile Chauffeur (Dump Truck)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $35.84
Supplemental Benefit Rate per Hour: $36.93

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $37.01
Supplemental Benefit Rate per Hour: $38.65

Driver - Heavy Equipment Trailer Driver

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $37.34
Supplemental Benefit Rate per Hour: $36.93
Note: For time and one half overtime Wage Rate - $53.76; for double time overtime Wage Rate - $71.68

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $38.51
Supplemental Benefit Rate per Hour: $38.65
Note: For time and one half overtime Wage Rate - $55.51; for double time overtime Wage Rate - $74.01

Driver - Euclid & Turnapull Operator

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $36.41
Supplemental Benefit Rate per Hour: $36.93

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $37.57
Supplemental Benefit Rate per Hour: $38.65

Driver - Six Wheeler(3 Axle) Tractors & Trailers

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $36.84
Supplemental Benefit Rate per Hour: $36.93
Note: For time and one half overtime Wage Rate - $54.62; for double time overtime Wage Rate - $72.82

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $38.01
Supplemental Benefit Rate per Hour: $38.65
Note: For time and one half overtime Wage Rate - $56.36; for double time overtime Wage Rate - $75.14

Driver - Boom Truck

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $37.09
Supplemental Benefit Rate per Hour: $36.93
Note: For time and one half overtime Wage Rate - $54.62; for double time overtime Wage Rate - $72.82

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $38.26
Supplemental Benefit Rate per Hour: $38.65
Note: For time and one half overtime Wage Rate - $56.36; for double time overtime Wage Rate - $75.14

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).
President's Day
Columbus Day
Veteran's Day
Day after Thanksgiving

Triple time the regular rate for work on the following holiday(s).
New Year's Day
Memorial Day
Independence Day
Labor Day
Presidential Election Day
Thanksgiving Day
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $37.47
Supplemental Benefit Rate per Hour: $38.65

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
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $51.00
Supplemental Benefit Rate per Hour: $42.45

Electrician "A" (Regular Day Overtime)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $76.50
Supplemental Benefit Rate per Hour: $45.13

Electrician "A" (Day Shift)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $51.00
Supplemental Benefit Rate per Hour: $42.45

Electrician "A" (Day Shift Overtime After 8 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $76.50
Supplemental Benefit Rate per Hour: $45.13

Electrician "A" (Swing Shift)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $59.84
Supplemental Benefit Rate per Hour: $48.20

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $89.76
Supplemental Benefit Rate per Hour: $51.36

Electrician "A" (Graveyard Shift)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $67.03
Supplemental Benefit Rate per Hour: $53.07

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $100.55
Supplemental Benefit Rate per Hour: $56.60

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.

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $25.30
Supplemental Benefit Rate per Hour: $17.52

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $37.95
Supplemental Benefit Rate per Hour: $18.85

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

(Local #3)

ELECTRICIAN - ALARM TECHNICIAN
(Scope of Work - Inspect, test, repair, and replace defective, malfunctioning, or broken devices, components and controls of Fire, Burglar and Security Systems)

Alarm Technician

Effective Period: 7/1/2012 - 3/9/2013
Wage Rate per Hour: $29.90
Supplemental Benefit Rate per Hour: $13.70
Supplemental Note: $12.20 only after 8 hours worked in a day

Effective Period: 3/10/2013 - 6/30/2013
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

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $51.00
Supplemental Benefit Rate per Hour: $44.18

Electrician - Electro Pole Foundation Installer

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $38.66
Supplemental Benefit Rate per Hour: $34.12

Electrician - Electro Pole Maintainer

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $33.10
Supplemental Benefit Rate per Hour: $30.84

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: 7/1/2012 - 3/16/2013
Wage Rate per Hour: $55.20
Supplemental Benefit Rate per Hour: $32.78

Effective Period: 3/17/2013 - 6/30/2013
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.

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: 7/1/2012 - 3/16/2013
Wage Rate per Hour: $43.79
Supplemental Benefit Rate per Hour: $31.37

Effective Period: 3/17/2013 - 6/30/2013
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
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

Cherrypickers 20 tons and over and Loaders (rubber tired and/or tractor type with a manufacturer's minimum rated capacity of six cubic yards and over).

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $58.75
Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $94.00

Engineer - Heavy Construction Operating Engineer II

Backhoes, Basin Machines, Groover, Mechanical Sweepers, Bobcat, Boom Truck, Barrier Transport (Barrier Mover) & machines of similar nature. Operation of Churn Drills and machines of a similar nature, Stetco Silent Hoist and machines of similar nature, Vac-Alls, Meyers Machines, John Beam and machines of a similar nature, Ross Carriers and Travel Lifts and machines of a similar nature, Bulldozers, Scrapers and Turn-a-Pulls: Tugger Hoists (Used exclusively for handling excavated material); Tractors with attachments, Hyster and Roustabout Cranes, Cherrypickers. Austin Western, Grove and machines of a similar nature, Scoopmobiles, Monorails, Conveyors, Trenchers: Loaders-Rubber Tired and Tractor: Barber Greene and Eimco Loaders and Eimco Backhoes; Mighty Midget and similar breakers and Tampers, Curb and Gutter Pavers and Motor Patrol, Motor Graders and all machines of a similar nature. Locomotives 10 Tons or under. Mini-Max, Break-Tech and machines of a similar nature; Milling machines, robotic and demolition machines and machines of a similar nature, shot blaster, skid steer machines and machines of a similar nature including bobcat, pile rig rubber-tired excavator (37,000 lbs. and under), 2 man auger.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $57.00
Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $91.20

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $56.74
Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $90.78

Engineer - Heavy Construction Maintenance Engineer II

On Base Mounted Tower Cranes

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $74.44
Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $119.10

Engineer - Heavy Construction Maintenance Engineer III

On Generators, Light Towers

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $37.56
Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $60.10

Engineer - Heavy Construction Maintenance Engineer IV

On Pumps and Mixers including mud sucking

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $38.53
Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $61.65

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $54.09
Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $86.54

Engineer - Heavy Construction Oilers I

Gradalls, Cold Planer Grader, Concrete Pumps, Driving Truck Cranes, Driving and Operating Fuel and Grease Trucks.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $51.19

Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $81.90

Engineer - Heavy Construction Oilers II

All gasoline, electric, diesel or air operated Shovels, Draglines, Backhoes, Keystones, Pavers, Gunite Machines, Battery of Compressors, Crawler Cranes, two-person Trenching Machines.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $35.50
Supplemental Benefit Rate per Hour: $31.07
Supplemental Note: $55.74 on overtime
Shift Wage Rate: $56.80

Engineer - Steel Erection Maintenance Engineers

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $54.33
Supplemental Benefit Rate per Hour: $29.66
Supplemental Note: $53.17 on overtime
Shift Wage Rate: $86.93

Engineer - Steel Erection Oiler I

On a Truck Crane

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $50.91
Supplemental Benefit Rate per Hour: $29.66
Supplemental Note: $53.17 on overtime
Shift Wage Rate: $81.46

Engineer - Steel Erection Oiler II

On a Crawler Crane

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $39.04
Supplemental Benefit Rate per Hour: $29.66
Supplemental Note: $53.17 on overtime
Shift Wage Rate: $62.46

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
Election 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

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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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $51.62
Supplemental Benefit Rate per Hour: $29.66
Supplemental Note: $53.17 on overtime

Engineer - Building Work Maintenance Engineers II

On Pumps, Generators, Mixers and Heaters

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $40.34
Supplemental Benefit Rate per Hour: $29.66
Supplemental Note: $53.17 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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $49.12
Supplemental Benefit Rate per Hour: $29.66
Supplemental Note: $53.17 on overtime

Engineer - Building Work Oilers II

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $36.75
Supplemental Benefit Rate per Hour: $29.66
Supplemental Note: $53.17 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
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $34.61
Supplemental Benefit Rate per Hour: $17.30

Instrument Person

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $28.59
Supplemental Benefit Rate per Hour: $17.30

Rodperson

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $24.79
Supplemental Benefit Rate per Hour: $17.30

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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $53.64
Supplemental Benefit Rate per Hour: $26.95
Supplemental Note: Overtime Benefit Rate - $37.48 per hour (time & one half) $48.00 per hour (double time).

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $55.74
Supplemental Benefit Rate per Hour: $29.73
Supplemental Note: Overtime Benefit Rate - $41.40 per hour (time & one half) $53.06 per hour (double time).

Field Engineer - BC Instrument Person

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $41.94
Supplemental Benefit Rate per Hour: $26.95
Supplemental Note: Overtime Benefit Rate - $37.48 per hour (time & one half) $48.00 per hour (double time).

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $43.30
Supplemental Benefit Rate per Hour: $29.73
Supplemental Note: Overtime Benefit Rate - $41.40 per hour (time & one half) $53.06 per hour (double time).

Field Engineer - BC Rodperson

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $27.52
Supplemental Benefit Rate per Hour: $26.95
Supplemental Note: Overtime Benefit Rate - $37.48 per hour (time & one half) $48.00 per hour (double time).

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $27.97
Supplemental Benefit Rate per Hour: $29.73
Supplemental Note: Overtime Benefit Rate - $41.40 per hour (time & one half) $53.06 per hour (double time).

Overtime Description

Time and one half the regular rate after a 7 hour work and time and one half the regular rate for Saturday for the first seven hours worked, Double time the regular time rate for Saturday for work performed in excess of seven hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

Paid Holidays

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day

Thanksgiving Day
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - FIELD (HEAVY CONSTRUCTION)
(Construction of Roads, Tunnels, Bridges, Sewers, Building Foundations, Engineering Structures etc.)

Field Engineer - HC Party Chief

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $60.28
Supplemental Benefit Rate per Hour: $29.73
Supplemental Note: Overtime benefit rate - $41.40 per hour (time & one half), $53.06 per hour (double time).

Field Engineer - HC Instrument Person

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $44.28
Supplemental Benefit Rate per Hour: $29.73
Supplemental Note: Overtime benefit rate - $41.40 per hour (time & one half), $53.06 per hour (double time).

Field Engineer - HC Rodperson

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $37.11
Supplemental Benefit Rate per Hour: $29.73
Supplemental Note: Overtime benefit rate - $41.40 per hour (time & one half), $53.06 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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $54.50
Supplemental Benefit Rate per Hour: $26.95
Supplemental Note: Overtime benefit rate - $37.48 per hour (time & one half), $48.00 per hour (double time).

Field Engineer - Steel Erection Instrument Person

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $42.63
Supplemental Benefit Rate per Hour: $26.95
Supplemental Note: Overtime benefit rate - $37.48 per hour (time & one half), $48.00 per hour (double time).

Field Engineer - Steel Erection Rodperson

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $28.84
Supplemental Benefit Rate per Hour: $26.95
Supplemental Note: Overtime benefit rate - $37.48 per hour (time & one half), $48.00 per hour (double time).

Overtime Description
Time and one half the regular rate for Saturday for the first eight hours worked.
Double time the regular rate for Saturday for work performed in excess of eight hours.

Overtime
Time and one half the regular rate after an 8 hour day.
Double time the regular rate for Sunday.
Double time the regular rate for work on the following holiday(s).

Paid Holidays
New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day

Veteran's Day
Thanksgiving Day
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - OPERATING

Operating Engineer - Road & Heavy Construction I

Back Filling Machines, Cranes, Mucking Machines and Dual Drum Paver.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $64.38
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $103.01

Operating Engineer - Road & Heavy Construction II

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $66.70
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: 51.85 overtime hours
Shift Wage Rate: $106.72

Operating Engineer - Road & Heavy Construction III

Mine Hoists, Cranes, etc. (Used as Mine Hoists)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $68.86
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $110.18

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $67.21

Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $107.54

Operating Engineer - Road & Heavy Construction V

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $65.86
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $105.38

Operating Engineer - Road & Heavy Construction VI

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $62.51
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $100.02

Operating Engineer - Road & Heavy Construction VII

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $50.27
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $80.43

Operating Engineer - Road & Heavy Construction VIII

Utility Compressors

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $36.37
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $46.38

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $38.78
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Shift Wage Rate: $49.16

Operating Engineer - Road & Heavy Construction IX

Horizontal Boring Rig

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $56.24
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $89.98

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $59.39
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $95.02

Operating Engineer - Road & Heavy Construction X

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $54.50
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $87.20

Operating Engineer - Road & Heavy Construction XI

Compressors (Portable 3 or more in battery), Driving of Truck Mounted Compressors, Well-point Pumps, Tugger Machines Well Point Pumps, Churn Drill.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $42.11
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $67.38

Operating Engineer - Road & Heavy Construction XII

All Drills and Machines of a similar nature.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $63.18
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $101.09

Operating Engineer - Road & Heavy Construction XIII

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $61.14
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $97.82

Operating Engineer - Road & Heavy Construction XIV

Concrete Mixer

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $58.34
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $93.49

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $39.03
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $62.45

Operating Engineer - Road & Heavy Construction XVI

Concrete Breaking Machines, Single Drum Hoists, Locomotives (over ten tons) and Dinkies over ten tons, Hydraulic Crane-Second Engineer.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $55.73
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $89.17

Operating Engineer - Road & Heavy Construction XVII

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $56.19
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $89.90

Operating Engineer - Road & Heavy Construction XVIII

Tower Crane

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $81.09
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $129.74

Operating Engineer - Paving I

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

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $59.25
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $94.80

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $62.51
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $100.02

Operating Engineer - Paving II

Asphalt Roller

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $57.65
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $92.24

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $60.85
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $97.36

Operating Engineer - Paving III

Asphalt Plants

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $48.46
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $77.54

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $51.32
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $82.11

Operating Engineer - Concrete I

Cranes

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $63.49
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Operating Engineer - Concrete II

Compressors

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $36.91
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Operating Engineer - Concrete III

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $50.31
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Operating Engineer - Steel Erection I

Three Drum Derricks

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: $67.62
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $108.19

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $70.50
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $112.80

Operating Engineer - Steel Erection II

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

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $64.91
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $103.86

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $67.71
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $108.34

Operating Engineer - Steel Erection III

Compressors, Welding Machines.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $37.87
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $60.59

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $39.86
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $63.78

Operating Engineer - Steel Erection IV

Compressors - Not Combined with Welding Machine.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $36.00

Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $57.60

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $37.93
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours
Shift Wage Rate: $60.69

Operating Engineer - Building Work I

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

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $53.09
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $55.46
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Operating Engineer - Building Work II

Compressors, Welding Machines (Cutting Concrete-Tank Work), Paint Spraying, Sandblasting, Pumps (with the exclusion of Concrete Pumps), House Car (settlement basis only), All Engines irrespective of Power (Power-Pac) used to drive Auxiliary Equipment, Air, Hydraulic, etc.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $39.35
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $41.32
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Operating Engineer - Building Work III

Double Drum

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $60.66
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $63.25
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Operating Engineer - Building Work IV

Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $64.35
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $67.05
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Operating Engineer - Building Work V

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $59.17
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $61.72
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Operating Engineer - Building Work VI

4 Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $58.53
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $61.06
Supplemental Benefit Rate per Hour: $28.65
Supplemental Note: $51.85 overtime hours

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
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

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: 7/1/2012 - 6/30/2013
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
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: 7/1/2012 - 10/31/2012
Wage Rate per Hour: $40.00
Supplemental Benefit Rate per Hour: $32.89
Supplemental Note: Supplemental Benefit Overtime Rate: $40.54

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate per Hour: $40.50
Supplemental Benefit Rate per Hour: $33.24
Supplemental Note: Supplemental Benefit Overtime Rate: $41.24

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
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: 7/1/2012 - 4/30/2013
Wage Rate per Hour: $23.40
Supplemental Benefit Rate per Hour: $18.04

Effective Period: 5/1/2013 - 6/30/2013
Wage Rate per Hour: $23.50
Supplemental Benefit Rate per Hour: $18.54

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

(Local #1281)

HEAT AND FROST INSULATOR

Heat & Frost Insulator

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $54.28
Supplemental Benefit Rate per Hour: $31.36

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $55.98
Supplemental Benefit Rate per Hour: $32.36

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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $33.00
Supplemental Benefit Rate per Hour: $24.15

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $33.51
Supplemental Benefit Rate per Hour: $24.64

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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $23.05
Supplemental Benefit Rate per Hour: $17.85

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: $23.25
Supplemental Benefit Rate per Hour: $18.35

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

(Mason Tenders District Council)

IRON WORKER - ORNAMENTAL

Iron Worker - Ornamental

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $41.50
Supplemental Benefit Rate per Hour: $39.52
Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $42.00
Supplemental Benefit Rate per Hour: $42.89
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $45.05
Supplemental Benefit Rate per Hour: $57.85
Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $46.00
Supplemental Benefit Rate per Hour: $61.23
Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Overtime Description

Monday through Friday- the first eight hours are paid at straight time, the 9th and 10th hours are paid at time and one-half the regular rate, all additional weekday overtime is paid at double the regular rate. Saturdays- the first eight hours are paid at time and one-half the regular rate, double time thereafter. Sunday-all shifts are paid at double time.

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $38.70
Supplemental Benefit Rate per Hour: $31.75

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $24.25
Supplemental Benefit Rate per Hour: $12.30

Landscaper (3 - 6 years experience)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $23.25
Supplemental Benefit Rate per Hour: $12.30

Landscaper (up to 3 years experience)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $20.75
Supplemental Benefit Rate per Hour: $12.30

Groundperson

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $20.75
Supplemental Benefit Rate per Hour: $12.30

Tree Remover / Pruner

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $29.25
Supplemental Benefit Rate per Hour: $12.30

Landscaper Sprayer (Pesticide Applicator)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $19.25
Supplemental Benefit Rate per Hour: $12.30

Watering - Plant Maintainer

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $49.19
Supplemental Benefit Rate per Hour: $32.24

Marble Finisher

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $39.05
Supplemental Benefit Rate per Hour: $31.43

Marble Polisher

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $34.24
Supplemental Benefit Rate per Hour: $24.40

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $34.50
Supplemental Benefit Rate per Hour: $25.14

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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $33.87
Supplemental Benefit Rate per Hour: $19.22

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $34.07
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $23.07
Supplemental Benefit Rate per Hour: $13.53

Effective Period: 1/1/2013 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $41.23
Supplemental Benefit Rate per Hour: $38.35
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
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 (½) 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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $46.19
Supplemental Benefit Rate per Hour: $45.67

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
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: 7/1/2012 - 12/31/2012

Wage Rate per Hour: $43.93
Supplemental Benefit Rate per Hour: $33.08
Supplemental Note: Supplemental benefits for overtime to be paid at the rate of $44.05 per hour.

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $44.39
Supplemental Benefit Rate per Hour: $35.12
Supplemental Note: Supplemental benefits for overtime to be paid at the rate of $46.09 per hour.

Mosaic Mechanic - Mosaic & Terrazzo Finisher

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $42.36
Supplemental Benefit Rate per Hour: $33.08
Supplemental Note: Supplemental benefits for overtime to be paid at the rate of $44.05 per hour.

Effective Period: 1/1/2013 - 6/30/2013
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $42.36
Supplemental Benefit Rate per Hour: $33.08
Supplemental Note: Supplemental benefits for overtime to be paid at the rate of $44.05 per hour.

Effective Period: 1/1/2013 - 6/30/2013
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

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: 7/1/2012 - 10/31/2012
Wage Rate per Hour: $35.50
Supplemental Benefit Rate per Hour: $25.12
Supplemental Note: $29.75 on overtime

Effective Period: 11/1/2012 - 4/30/2013
Wage Rate per Hour: $36.00
Supplemental Benefit Rate per Hour: $25.12
Supplemental Note: $29.75 on overtime

Effective Period: 5/1/2013 - 6/30/2013
Wage Rate per Hour: $37.50
Supplemental Benefit Rate per Hour: $25.12
Supplemental Note: $29.75 on overtime

Spray & Scaffold / Decorative / Sandblast

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate per Hour: $38.50
Supplemental Benefit Rate per Hour: $25.12
Supplemental Note: $29.75 on overtime

Effective Period: 11/1/2012 - 4/30/2013
Wage Rate per Hour: $39.00
Supplemental Benefit Rate per Hour: $25.12
Supplemental Note: $29.75 on overtime

Effective Period: 5/1/2013 - 6/30/2013
Wage Rate per Hour: $40.50
Supplemental Benefit Rate per Hour: $25.12
Supplemental Note: $29.75 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
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $36.15
Supplemental Benefit Rate per Hour: $9.66

Journeyperson

Effective Period: 7/1/2012 - 6/30/2013
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

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $33.00
Supplemental Benefit Rate per Hour: $11.52
Supplemental Note: Overtime Supplemental Benefit rate - $7.42; New Hire Rate (0-3 months) - $0.00

Lineperson (thermoplastic)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $37.00
Supplemental Benefit Rate per Hour: $11.52
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 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: 7/1/2012 - 9/30/2012
Wage Rate per Hour: $46.25
Supplemental Benefit Rate per Hour: $31.58

Effective Period: 10/1/2012 - 6/30/2013
Wage Rate per Hour: $47.00
Supplemental Benefit Rate per Hour: $32.08

Painter - Power Tool

Effective Period: 7/1/2012 - 9/30/2012
Wage Rate per Hour: $52.25
Supplemental Benefit Rate per Hour: $31.58

Effective Period: 10/1/2012 - 6/30/2013
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: 7/1/2012 - 4/30/2013
Wage Rate per Hour: $37.44
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: 5/1/2013 - 6/30/2013
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.

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $42.86
Supplemental Benefit Rate per Hour: $32.15

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 and repair of temporary construction fencing; slurry seal coating, maintenance of safety surfaces; play equipment installation, and other related work.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $38.99
Supplemental Benefit Rate per Hour: $32.15

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $45.00
Supplemental Benefit Rate per Hour: $32.15

Production Paver & Roadbuilder - Raker

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $44.49
Supplemental Benefit Rate per Hour: $32.15

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $41.20

Supplemental Benefit Rate per Hour: $32.15

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 15%, except if an employee works on production paving on New Year's Day or Christmas Day, they receive the single time rate plus one day's pay for the holiday worked.

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
Columbus Day
Election Day
Thanksgiving Day

Shift Rates

When two shifts are employed, the work period for each shift shall be a continuous eight (8) hours. When three shifts are employed, each shift will work seven and one half (7 ½) hours but will be paid for eight (8) hours 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 fifteen percent (15%) over the single time rate, except that production paving work shall be paid at 25% over the single time rate. 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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $40.78
Supplemental Benefit Rate per Hour: $26.80

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $40.78
Supplemental Benefit Rate per Hour: $27.55

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.
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $34.24
Supplemental Benefit Rate per Hour: $24.40

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $34.50
Supplemental Benefit Rate per Hour: $25.14

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Washington's Birthday
Memorial Day
Independence Day
Labor Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
When work commences outside regular work hours, workers receive an hour additional (differential) wage and supplement payment. Eight hours pay for seven hours work or nine hours pay for eight hours work.

(Mason Tenders District Council)

PLUMBER

Plumber

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $51.76
Supplemental Benefit Rate per Hour: $37.19
Supplemental Note: Overtime supplemental benefit rate per hour: $74.10

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $52.36
Supplemental Benefit Rate per Hour: $37.34
Supplemental Note: Overtime supplemental benefit rate per hour: $74.40

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 million or less, and for public works jobs where the plumbing contract 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 (MECHNICAL EQUIPMENT AND SERVICE)
(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $32.96
Supplemental Benefit Rate per Hour: $15.93

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $33.21
Supplemental Benefit Rate per Hour: $16.43

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

(Plumbers Local # 1)

PLUMBER (RESIDENTIAL RATES FOR 1, 2 AND 3 FAMILY HOME CONSTRUCTION)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $36.69
Supplemental Benefit Rate per Hour: $25.46

Effective Period: 1/1/2013 - 6/30/2013
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.

(Plumbers Local #1)

PLUMBER: PUMP & TANK (Installation and Maintenance)

Plumber - Pump & Tank

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $52.31
Supplemental Benefit Rate per Hour: $31.56

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).
New Year's Day
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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $44.63
Supplemental Benefit Rate per Hour: $23.10

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $38.00
Supplemental Benefit Rate per Hour: $27.07

Effective Period: 1/1/2013 - 6/30/2013

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
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $44.63
Supplemental Benefit Rate per Hour: $23.10

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
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)

SHEET METAL WORKER

Sheet Metal Worker

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $45.65
Supplemental Benefit Rate per Hour: $40.50
Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $45.65
Supplemental Benefit Rate per Hour: $42.00
Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Sheet Metal Worker - Duct Cleaner

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $36.52
Supplemental Benefit Rate per Hour: $40.50

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $36.52
Supplemental Benefit Rate per Hour: $42.00

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

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 journeyperson 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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $40.09
Supplemental Benefit Rate per Hour: $22.06
Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

(Local #28)

SIGN ERECTOR
(Sheet Metal, Plastic, Electric, and Neon)

Sign Erector

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $41.55
Supplemental Benefit Rate per Hour: $39.32

Effective Period: 1/1/2013 - 6/30/2013
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $50.75
Supplemental Benefit Rate per Hour: $49.68
Supplemental Note: Overtime supplemental benefit rate: $98.62

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $51.25
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $50.75
Supplemental Benefit Rate per Hour: $49.68
Supplemental Note: Overtime supplemental benefit rate: $98.62

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $51.25
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
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $36.30
Supplemental Benefit Rate per Hour: $11.76

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $37.05
Supplemental Benefit Rate per Hour: $12.26

Refrigeration and Air Conditioner Service Person V (4th year)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $29.82
Supplemental Benefit Rate per Hour: $10.71

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $30.44
Supplemental Benefit Rate per Hour: $11.13

Refrigeration and Air Conditioner Service Person IV (3rd year)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.71
Supplemental Benefit Rate per Hour: $9.80

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: $25.22
Supplemental Benefit Rate per Hour: $10.16

Refrigeration and Air Conditioner Service Person III (2nd year)

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $21.21
Supplemental Benefit Rate per Hour: $9.12

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $21.65
Supplemental Benefit Rate per Hour: $9.44

Refrigeration and Air Conditioner Service Person II (2nd six months)

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $17.60
Supplemental Benefit Rate per Hour: $8.50

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $17.96
Supplemental Benefit Rate per Hour: $8.78

Refrigeration and Air Conditioner Service Person I (1st six months)

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $10.95
Supplemental Benefit Rate per Hour: $7.90

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $11.18
Supplemental Benefit Rate per Hour: $8.10

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).
New Year's Day
Independence Day
Labor Day
Veteran's Day
Thanksgiving Day
Christmas Day

Double time and one half the regular rate for work on the following holiday(s).
Martin Luther King Jr. Day
President's Day
Memorial Day
Columbus Day

Paid Holidays

New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

(Local #638B)

STONE MASON - SETTER

Stone Mason - Setters

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 12/25/2012
Wage Rate per Hour: $43.32
Supplemental Benefit Rate per Hour: $21.66

Effective Period: 12/26/2012 - 6/30/2013
Wage Rate per Hour: $43.82
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: 7/1/2012 - 6/30/2013
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.
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $38.17
Supplemental Benefit Rate per Hour: $26.76

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $38.49
Supplemental Benefit Rate per Hour: $27.42

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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $47.75
Supplemental Benefit Rate per Hour: $30.83

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $48.55
Supplemental Benefit Rate per Hour: $31.46

Overtime

Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

TIMBERPERSON

Timberperson

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $42.63
Supplemental Benefit Rate per Hour: $41.99

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
Off shift work, commencing between 5:00 P.M. and 10:00 P.M., shall work eight and one half hours but will be paid for 9 hours, including benefits at the straight time rate for 8 hours.

(Local #1536)

TUNNEL WORKER

Blasters, Mucking Machine Operators (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $52.00
Supplemental Benefit Rate per Hour: $46.85

Tunnel Workers (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $50.19
Supplemental Benefit Rate per Hour: $45.29

Top Nipper (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $49.27
Supplemental Benefit Rate per Hour: $44.51

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $48.37
Supplemental Benefit Rate per Hour: $43.67

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $48.37
Supplemental Benefit Rate per Hour: $43.67

Changehouse Attendant: Powder Watchperson (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $42.09
Supplemental Benefit Rate per Hour: $41.41

Blasters (Free Air Rates)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $49.62
Supplemental Benefit Rate per Hour: $44.75

Tunnel Workers (Free Air Rates)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $47.48
Supplemental Benefit Rate per Hour: $42.84

All Others (Free Air Rates)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $43.87
Supplemental Benefit Rate per Hour: $39.62

Microtunneling (Free Air Rates)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $37.98
Supplemental Benefit Rate per Hour: $34.27

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.

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.

APPRENTICESHIP SCHEDULE OF PREVAILING WAGES AND SUPPLEMENTAL BENEFITS ADDENDUM
EFFECTIVE PERIOD JANUARY 1, 2013 THROUGH JUNE 30, 2013

List of Amended Classifications

1. Boilermaker
2. House Wrecker
3. Iron Worker - Ornamental
4. Iron Worker - Structural
5. Mason Tender
6. Plasterer
7. Plumber

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ASBESTOS HANDLER
(Ratio of Apprentice Journeyperson: 1 to 1, 1 to 3)

Asbestos Handler (First 1000 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 78% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.85

Asbestos Handler (Second 1000 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.85

Asbestos Handler (Third 1000 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 83% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.85

Asbestos Handler (Fourth 1000 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 89% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.85

(Local #78)

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

Boilermaker (First Year)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.41

Effective Period: 1/1/2013 - 3/31/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $28.45

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: $28.75

Boilermaker (Second Year: 1st Six Months)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $28.91

Effective Period: 1/1/2013 - 3/31/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $30.03

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $30.33

Boilermaker (Second Year: 2nd Six Months)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $30.40

Effective Period: 1/1/2013 - 3/31/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $31.61

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $31.91

Boilermaker (Third Year: 1st Six Months)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $31.89

Effective Period: 1/1/2013 - 3/31/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $33.19

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $33.49

Boilermaker (Third Year: 2nd Six Months)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $33.38

Effective Period: 1/1/2013 - 3/31/2013
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $34.76

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $35.06

Boilermaker (Fourth Year: 1st Six Months)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $34.88

Effective Period: 1/1/2013 - 3/31/2013
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $36.34

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $36.64

Boilermaker (Fourth Year: 2nd Six Months)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $36.38

Effective Period: 1/1/2013 - 3/31/2013
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $37.90

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $38.20

(Local #5)

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

Bricklayer (First 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $16.60

Bricklayer (Second 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $16.60

Bricklayer (Third 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $16.60

Bricklayer (Fourth 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $16.60

Bricklayer (Fifth 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $16.60

Bricklayer (Sixth 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $16.60

(Bricklayer District Council)

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

Carpenter (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.69

Carpenter (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.69

Carpenter (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.69

Carpenter (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.69

(Carpenters District Council)

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

Cement Mason (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's Rate

Cement Mason (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's Rate

Cement Mason (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's Rate

(Local #780)

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

Cement & Concrete Worker (0 - 500 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $17.54

Cement & Concrete Worker (501 - 1000 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $18.37

Cement & Concrete Worker (1001 - 2000 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $23.75

Cement & Concrete Worker (2001 - 4000 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $24.57

(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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.69

Dockbuilder/Pile Driver (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.69

Dockbuilder/Pile Driver (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.69

Dockbuilder/Pile Driver (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $27.69

(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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $14.25
Supplemental Benefit Rate per Hour: $11.19
Overtime Wage Rate Per Hour: $21.38

Overtime Supplemental Rate Per Hour: $11.96

Electrician (First Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $11.50
Supplemental Benefit Rate per Hour: $9.86
Overtime Wage Rate Per Hour: $17.25
Overtime Supplemental Rate Per Hour: $10.48

Electrician (Second Year - Hired before 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $17.05
Supplemental Benefit Rate per Hour: $12.54
Overtime Wage Rate Per Hour: $25.58
Overtime Supplemental Rate Per Hour: $13.47

Electrician (Second Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $13.50
Supplemental Benefit Rate per Hour: $10.83
Overtime Wage Rate Per Hour: $20.25
Overtime Supplemental Rate Per Hour: $11.56

Electrician (Third Year - Hired before 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $19.15
Supplemental Benefit Rate per Hour: $13.56
Overtime Wage Rate Per Hour: $28.73
Overtime Supplemental Rate Per Hour: $14.60

Electrician (Third Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $15.50
Supplemental Benefit Rate per Hour: $11.79
Overtime Wage Rate Per Hour: $23.25
Overtime Supplemental Rate Per Hour: $12.63

Electrician (Fourth Year - Hired before 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $21.10
Supplemental Benefit Rate per Hour: $14.50
Overtime Wage Rate Per Hour: $31.65
Overtime Supplemental Rate Per Hour: $15.65

Electrician (Fourth Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $17.50
Supplemental Benefit Rate per Hour: $12.76
Overtime Wage Rate Per Hour: $26.25
Overtime Supplemental Rate Per Hour: $13.71

Electrician (Fifth Year - Hired before 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $25.30
Supplemental Benefit Rate per Hour: $17.52
Overtime Wage Rate Per Hour: $37.95
Overtime Supplemental Rate Per Hour: $18.85

Electrician (Fifth Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $21.50
Supplemental Benefit Rate per Hour: $15.71
Overtime Wage Rate Per Hour: $32.25
Overtime Supplemental Rate Per Hour: $16.84

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 Journeyperson: 1 to 1, 1 to 2)

Elevator (Constructor) - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $25.40
Effective 3/17/2013 - Supplemental Rate Per Hour: $26.87

Elevator (Constructor) - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $26.43
Effective 3/17/2013 - Supplemental Rate Per Hour: $27.92

Elevator (Constructor) - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $27.84
Effective 3/17/2013 - Supplemental Rate Per Hour: $29.38

Elevator (Constructor) - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $29.25
Effective 3/17/2013 - Supplemental Benefit Per Hour: $30.84

(Local #1)

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

Elevator Service/Modernization Mechanic (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Per Hour: $25.33
Effective 3/17/2013 - Supplemental Benefit Per Hour: $26.79

Elevator Service/Modernization Mechanic (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Benefit Per Hour: $25.65
Effective 3/17/2013 - Supplemental Benefit Per Hour: $27.12

Elevator Service/Modernization Mechanic (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Per Hour: $26.92
Effective 3/17/2013 - Supplemental Benefit Per Hour: $28.43

Elevator Service/Modernization Mechanic (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Per Hour: $28.19

Effective 3/17/2013 - Supplemental Benefit Per Hour: $29.74

(Local #1)

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

Engineer - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $21.64
Supplemental Benefit Rate per Hour: $20.07

Engineer - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $27.05
Supplemental Benefit Rate per Hour: $20.07

Engineer - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $29.75
Supplemental Benefit Rate per Hour: $20.07

Engineer - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $32.45
Supplemental Benefit Rate per Hour: $20.07

(Local #15)

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

Operating Engineer - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour 40% of Journeyperson's Rate

Supplemental Benefit Per Hour: $18.65

Operating Engineer - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's Rate
Supplemental Benefit Per Hour: $18.65

Operating Engineer - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's Rate
Supplemental Benefit Per Hour: $18.65

(Local #14)

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

Floor Coverer (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Rate Per Hour: $25.75

Floor Coverer (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $25.75

Floor Coverer (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $25.75

Floor Coverer (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $25.75

(Carpenters District Council)

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

Glazier (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Rate Per Hour: $11.97

Glazier (Second Year)

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $21.01

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $21.13

Glazier (Third Year)

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $23.38

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $23.54

Glazier (Fourth Year)

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $28.14

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $28.34

(Local #1281)

HEAT & FROST INSULATOR
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Heat & Frost Insulator (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Heat & Frost Insulator (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Heat & Frost Insulator (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Heat & Frost Insulator (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #12)

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

House Wrecker - First Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $20.06
Supplemental Benefit Rate per Hour: $15.45

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $20.21
Supplemental Benefit Rate per Hour: $15.80

House Wrecker - Second Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $21.06
Supplemental Benefit Rate per Hour: $15.45

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: $21.26
Supplemental Benefit Rate per Hour: $15.80

House Wrecker - Third Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $22.56
Supplemental Benefit Rate per Hour: $15.45

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $22.81
Supplemental Benefit Rate per Hour: $15.80

House Wrecker - Fourth Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $25.06
Supplemental Benefit Rate per Hour: $15.45

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $25.36
Supplemental Benefit Rate per Hour: $15.80

(Local #79)

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

Iron Worker (Ornamental) - 1st Four Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $32.06

Iron Worker (Ornamental) 5 - 10 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $32.89

Iron Worker (Ornamental) 11 - 16 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $33.73

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $34.34

Iron Worker (Ornamental) 17 - 22 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $35.39

Iron Worker (Ornamental) 23 - 28 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Rate Per Hour: $36.22

Iron Worker (Ornamental) 29 - 36 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Rate Per Hour: $37.89

Iron Worker (Ornamental) - 1st Ten Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $30.40

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $33.39

Iron Worker (Ornamental) - 11 - 16 Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $31.23

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $34.34

Iron Worker (Ornamental) - 17 - 22 Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $32.06

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $35.29

Iron Worker (Ornamental) - 23 - 28 Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $33.73

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $37.19

Iron Worker (Ornamental) - 29 - 36 Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $35.39

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $39.09

(Local #580)

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

Iron Worker (Structural) - 1st Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $23.62
Supplemental Benefit Rate per Hour: $41.21

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $24.10
Supplemental Benefit Rate per Hour: $43.12

Iron Worker (Structural) - 7- 18 Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.22
Supplemental Benefit Rate per Hour: $41.21

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $24.70
Supplemental Benefit Rate per Hour: $43.12

Iron Worker (Structural) - 19 - 36 months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.82
Supplemental Benefit Rate per Hour: $41.21

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $25.30
Supplemental Benefit Rate per Hour: $43.12

(Local #40 and #361)

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

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $31.75

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $31.75

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $31.75

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

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Rate Per Hour: $31.75

(Local #731)

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

Cutters & Setters - First 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

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

Cutters & Setters - Second 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Cutters & Setters - Third 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Cutters & Setters - Fourth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Cutters & Setters - Fifth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Cutters & Setters - Sixth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

Polishers & Finishers - First 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Polishers & Finishers - Third 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Polishers & Finishers - Fourth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $20.33
Supplemental Benefit Rate per Hour: $16.16

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $20.48
Supplemental Benefit Rate per Hour: $16.51

Mason Tender - Second Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $21.33
Supplemental Benefit Rate per Hour: $16.16

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $21.53
Supplemental Benefit Rate per Hour: $16.51

Mason Tender - Third Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $22.83

Supplemental Benefit Rate per Hour: $16.16

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $23.08
Supplemental Benefit Rate per Hour: $16.51

Mason Tender - Fourth Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $25.33
Supplemental Benefit Rate per Hour: $16.16

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $25.63
Supplemental Benefit Rate per Hour: $16.51

(Local #79)

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

Metallic Lather (First Year -Called Prior to 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $27.91
Supplemental Benefit Rate per Hour: $22.79

Metallic Lather (Second Year - Called Prior to 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $32.51
Supplemental Benefit Rate per Hour: $24.44

Metallic Lather (Third Year - Called Prior to 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $37.57
Supplemental Benefit Rate per Hour: $25.59

Metallic Lather (First Year -Called On Or After 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $22.71
Supplemental Benefit Rate per Hour: $19.85

Metallic Lather (Third Year - Called On Or After 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $27.71
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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $25.40
Supplemental Benefit Rate per Hour: $28.67

Millwright (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $30.02
Supplemental Benefit Rate per Hour: $31.87

Millwright (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $34.64
Supplemental Benefit Rate per Hour: $36.19

Millwright (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $43.88
Supplemental Benefit Rate per Hour: $41.50

(Local #740)

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

Paver and Roadbuilder - First Year (Minimum 1000 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $25.72
Supplemental Benefit Rate per Hour: $15.75

Paver and Roadbuilder - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $27.29
Supplemental Benefit Rate per Hour: $15.75

(Local #1010)

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

Painter - Brush & Roller - First Year

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate per Hour: $14.20
Supplemental Benefit Rate per Hour: $10.88

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate per Hour: $14.40
Supplemental Benefit Rate per Hour: $10.88

Painter - Brush & Roller - Second Year

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate per Hour: $17.75
Supplemental Benefit Rate per Hour: $14.73

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate per Hour: $18.00
Supplemental Benefit Rate per Hour: $14.73

Painter - Brush & Roller - Third Year

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate per Hour: $21.30
Supplemental Benefit Rate per Hour: $17.64

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate per Hour: $21.60
Supplemental Benefit Rate per Hour: $17.64

Painter - Brush & Roller - Fourth Year

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate per Hour: $28.40
Supplemental Benefit Rate per Hour: $23.02

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate per Hour: $28.80
Supplemental Benefit Rate per Hour: $23.02

(District Council of Painters)

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

Painters - Structural Steel (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Painters - Structural Steel (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Painters - Structural Steel (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #806)

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

Plasterer - First Year: 1st Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Rate Per Hour: $14.61

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Rate Per Hour: $15.36

Plasterer - First Year: 2nd Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 45% of Journeyperson's rate
Supplemental Rate Per Hour: $15.09

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 45% of Journeyperson's rate
Supplemental Rate Per Hour: $15.84

Plasterer - Second Year: 1st Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $17.06

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $17.81

Plasterer - Second Year: 2nd Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $18.14

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $18.89

Plasterer - Third Year: 1st Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $20.31

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $21.06

Plasterer - Third Year: 2nd Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $21.39

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $22.14

(Local #530)

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

Plumber - First Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $14.00
Supplemental Benefit Rate per Hour: $0.71

Plumber - First Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $14.00
Supplemental Benefit Rate per Hour: $2.96

Plumber - Second Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $17.96
Supplemental Benefit Rate per Hour: $16.25

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $18.26
Supplemental Benefit Rate per Hour: $16.32

Plumber - Third Year

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: $20.06
Supplemental Benefit Rate per Hour: $16.25

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $20.36
Supplemental Benefit Rate per Hour: $16.32

Plumber - Fourth Year

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $22.91
Supplemental Benefit Rate per Hour: $16.25

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $23.21
Supplemental Benefit Rate per Hour: $16.32

Plumber - Fifth Year: 1st Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.31
Supplemental Benefit Rate per Hour: $16.25

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $24.61
Supplemental Benefit Rate per Hour: $16.32

Plumber - Fifth Year: 2nd Six Months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $36.38
Supplemental Benefit Rate per Hour: $16.25

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $36.68
Supplemental Benefit Rate per Hour: $16.32

(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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $25.00
Supplemental Benefit Rate per Hour: $3.45

Pointer - Waterproofer, Caulker Mechanic - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $27.25
Supplemental Benefit Rate per Hour: $8.40

Pointer - Waterproofer, Caulker Mechanic - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $32.23
Supplemental Benefit Rate per Hour: $11.15

Pointer - Waterproofer, Caulker Mechanic - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $38.66
Supplemental Benefit Rate per Hour: $11.15

(Bricklayer District Council)

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

Roofer - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 35% of Journeyperson's Rate

Roofer - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's Rate

Roofer - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's Rate

Roofer - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 30% of Journeyperson's rate
Supplemental Rate Per Hour: $15.37

Sheet Metal Worker - Second Year

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $23.69

Sheet Metal Worker - Fourth Year (2nd Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $25.33

Sheet Metal Worker - Fifth Year (1st Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $27.47

Sheet Metal Worker - Fifth Year(2nd Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $31.23

(Local #28)

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

Sign Erector - First Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 35% of Journeyperson's rate
Supplemental Rate Per Hour: $5.96

Sign Erector - First Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Rate Per Hour: $6.75

Sign Erector - Second Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 45% of Journeyperson's rate
Supplemental Rate Per Hour: $7.55

Sign Erector - Second Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $8.34

Sign Erector - Third Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $9.13

Sign Erector - Third Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $9.92

Sign Erector - Fourth Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $10.72

Sign Erector - Fourth Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $11.51

Sign Erector - Fifth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $12.30

Sign Erector - Sixth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $12.30

(Local #137)

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

Steamfitter - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate and Supplemental Per Hour: 40% of Journeyperson's rate

Steamfitter - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate and Supplemental Rate Per Hour: 50% of Journeyperson's rate.

Steamfitter - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate and Supplemental Rate per Hour: 65% of Journeyperson's rate.

Steamfitter - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate and Supplemental Rate Per Hour: 80% of Journeyperson's rate.

Steamfitter - Fifth Year

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Second 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Third 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
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: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Drywall Taper - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Drywall Taper - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #1974)

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

Tile Layer - Setter - First 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Tile Layer - Setter - Second 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Tile Layer - Setter - Third 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Tile Layer - Setter - Fourth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Tile Layer - Setter - Fifth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Tile Layer - Setter - Sixth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

(Local #7)

TIMBERPERSON
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Timberperson - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Rate Per Hour: $27.49

Timberperson - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $27.49

Timberperson - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Rate Per Hour: $27.49

Timberperson - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $27.49

(Local #1536)

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.

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
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 (oprime "Oficina de Derecho Laboral").

Wasyl Kinach, P.E.
Director of Classifications
Bureau of Labor Law

§230 SCHEDULE OF PREVAILING WAGES AND SUPPLEMENTAL BENEFITS ADDENDUM EFFECTIVE PERIOD JANUARY 1, 2013 THROUGH JUNE 30, 2013

List of Amended Changes

1. **MODIFIED PREAMBLE TO INCORPORATE PROVISIONS OF NYC ADMINISTRATIVE CODE §6-130**

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BOILER SERVICEPERSON/TANK CLEANER MECHANIC (LOW PRESSURE)

Boiler Service Person/Tank Cleaner Mechanic (Low Pressure)

Effective Period: 7/1/2012 - 6/30/2013
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 B/J)

BUILDING CLEANER AND MAINTAINER (OFFICE)

Office Building Class "A" Handyperson (Over 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.77
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $25.10
Supplemental Benefit Rate per Hour: $9.51

Office Building Class "A" Foreperson, Starter (Over 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.66
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $24.99
Supplemental Benefit Rate per Hour: $9.51

Office Building Class "A" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $22.65
Supplemental Benefit Rate per Hour: $9.13
Supplemental Note: for new employee 0-12 months of employment - $6.64; for new employee 13-24 months of employment - $8.81

Effective Period: 1/1/2013 - 6/30/2013
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.

Office Building Class "B" Handyperson (Over 120,000 and less than 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.74
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $25.07
Supplemental Benefit Rate per Hour: $9.51

Office Building Class "B" Foreperson, Starter (Over 120,000 and less than 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.63
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $24.95
Supplemental Benefit Rate per Hour: $9.51

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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $22.62
Supplemental Benefit Rate per Hour: $9.13
Supplemental Note: for new employee 0-12 months of employment - $6.64; for new employee 13-24 months of employment - $8.81

Effective Period: 1/1/2013 - 6/30/2013
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.

Office Building Class "C" Handyperson (Less than 120,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.70
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $25.02
Supplemental Benefit Rate per Hour: $9.51

Office Building Class "C" Foreperson, Starter (Less than 120,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.59
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $24.91
Supplemental Benefit Rate per Hour: $9.51

Office Building Class "C" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Less than 120,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $22.57
Supplemental Benefit Rate per Hour: $9.13
Supplemental Note: for new employee 0-12 months of employment - $6.64; for new employee 13-24 months of employment - $8.81

Effective Period: 1/1/2013 - 6/30/2013
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.

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: 7/1/2012 – 4/20/2013
Wage Rate per Hour: $22.94
Supplemental Benefit Rate per Hour: $8.68
Supplemental Note: Effective 1/1/2013 - $9.43

Effective Period: 4/21/2013 - 6/30/2013
Wage Rate per Hour: $23.57
Supplemental Benefit Rate per Hour: $9.43

Residential Building Class "A" Cleaner/Porter

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: 7/1/2012 - 4/20/2013
Wage Rate per Hour: $20.77
Supplemental Benefit Rate per Hour: $8.68
Supplemental Note: for new employee 0-12 months of employment - $6.37; for new employee 13-24 months of employment - $8.43
Effective 1/1/2013 - $9.43; for new employee 0-12 months of employment - $6.92; for new employee 13-24 months of employment - $9.18

Effective Period: 4/21/2013 - 6/30/2013

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.

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: 7/1/2012 - 4/20/2013
Wage Rate per Hour: $22.88
Supplemental Benefit Rate per Hour: $8.68
Supplemental Note: Effective 1/1/2013 - $9.43

Effective Period: 4/21/2013 - 6/30/2013
Wage Rate per Hour: $23.51
Supplemental Benefit Rate per Hour: $9.43

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: 7/1/2012 - 4/20/2013
Wage Rate per Hour: $20.71
Supplemental Benefit Rate per Hour: $8.68
Supplemental Note: for new employee 0-12 months of employment - $6.37; for new employee 13-24 months of employment - $8.43
Effective 1/1/2013 - $9.43; for new employee 0-12 months of employment - $6.92; for new employee 13-24 months of employment - $9.18

Effective Period: 4/21/2013 - 6/30/2013
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.

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: 7/1/2012 - 4/20/2013
Wage Rate per Hour: $22.83
Supplemental Benefit Rate per Hour: $8.68
Supplemental Note: Effective 1/1/2013 - $9.43

Effective Period: 4/21/2013 - 6/30/2013
Wage Rate per Hour: $23.45
Supplemental Benefit Rate per Hour: $9.43

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: 7/1/2012 - 4/20/2013
Wage Rate per Hour: $20.65
Supplemental Benefit Rate per Hour: $8.68
Supplemental Note: for new employee 0-12 months of employment - $6.37; for new employee 13-24 months of employment - $8.43
Effective 1/1/2013 - $9.43; for new employee 0-12 months of employment - $6.92; for new employee 13-24 months of employment - $9.18

Effective Period: 4/21/2013 - 6/30/2013
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.

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
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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $34.15
Supplemental Benefit Rate per Hour: $15.44

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $35.18
Supplemental Benefit Rate per Hour: $15.78

Fireperson

Fireperson (Helper): Assists the Engineer

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $26.59
Supplemental Benefit Rate per Hour: $15.09

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $27.39
Supplemental Benefit Rate per Hour: $15.41

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $10.00
Supplemental Benefit Rate per Hour: $1.50

Overtime

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(NYC Administrative Code §6-109)

FUEL OIL

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (5th Year and above)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: $30.11
Supplemental Benefit Rate per Hour: $18.80

Effective Period: 12/16/2012 - 6/30/2013

Wage Rate per Hour: $30.61
Supplemental Benefit Rate per Hour: $19.80
Supplemental Note: Effective 1/1/2013 - $20.42

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (4th Year)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: $27.50
Supplemental Benefit Rate per Hour: $18.80

Effective Period: 12/16/2012 - 6/30/2013
Wage Rate per Hour: $28.00
Supplemental Benefit Rate per Hour: $19.80
Supplemental Note: Effective 1/1/2013 - $20.42

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (3rd Year)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: $25.50
Supplemental Benefit Rate per Hour: $18.80

Effective Period: 12/16/2012 - 6/30/2013
Wage Rate per Hour: $26.00
Supplemental Benefit Rate per Hour: $19.80
Supplemental Note: Effective 1/1/2013 - $20.42

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (2nd Year)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: $23.50
Supplemental Benefit Rate per Hour: $18.80

Effective Period: 12/16/2012 - 6/30/2013
Wage Rate per Hour: $24.00
Supplemental Benefit Rate per Hour: $19.80
Supplemental Note: Effective 1/1/2013 - $20.42

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (1st Year)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: $21.50
Supplemental Benefit Rate per Hour: $18.80

Effective Period: 12/16/2012 - 6/30/2013
Wage Rate per Hour: $22.00
Supplemental Benefit Rate per Hour: $19.80
Supplemental Note: Effective 1/1/2013 - $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
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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: $17.04
Supplemental Benefit Rate per Hour: $1.72

Overtime
Time and one half the regular rate after an 8 hour day or 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)

LOCKSMITH

Locksmith

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $21.46
Supplemental Benefit Rate per Hour: $5.89

Overtime
Time and one half the regular rate after an 8 hour day or 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: 7/1/2012 - 3/31/2013
Wage Rate per Hour: $17.75
Supplemental Benefit Rate per Hour: $8.79

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate per Hour: $18.00
Supplemental Benefit Rate per Hour: $9.34

Helper

Effective Period: 7/1/2012 - 3/31/2013
Wage Rate per Hour: $14.00
Supplemental Benefit Rate per Hour: $8.79

Effective Period: 4/1/2013 - 6/30/2013
Wage Rate per Hour: $14.25
Supplemental Benefit Rate per Hour: $9.34

Tractor Trailer Driver

Effective Period: 7/1/2012 - 3/31/2013
Wage Rate per Hour: $20.25
Supplemental Benefit Rate per Hour: $8.79

Effective Period: 4/1/2013 - 6/30/2013
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

Presidents' Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Vacation

1 year of service but less than five years.....10 days
5 years of service but less than ten years.....15 days
10 years of service.....16 days
11 years.....17 days
12 years.....18 days
13 years.....19 days
14 years.....20 days
20 years.....21 days
21 years.....22 days
22 years.....23 days
23 years.....24 days
24 years.....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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $23.11

Supplemental Benefit Rate per Hour: $4.10

Light Truck Driver

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $18.08
Supplemental Benefit Rate per Hour: $4.10

Laborer and Freight, Stock, and Material Movers, Hand

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $17.68
Supplemental Benefit Rate per Hour: $4.10

Overtime
Time and one half the regular rate after an 8 hour day or 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)

REFUSE REMOVER

Refuse Remover

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: $27.62
Supplemental Benefit Rate per Hour: $4.10

Overtime
Time and one half the regular rate after an 8 hour day or 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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $27.75
Supplemental Benefit Rate per Hour: $4.73
Supplemental Note: for new employee 0-30 days of employment - $4.09; for new employee 31-120 days of employment - $4.26; for new employee 121 days - 2 years of employment - $4.37

Effective Period: 1/1/2013 - 6/30/2013

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

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
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas 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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $12.60
Supplemental Benefit Rate per Hour: $4.37
Supplemental Note: for new employee 0-30 days of employment - $4.09; for new employee 31-120 days of employment - $4.26

Effective Period: 1/1/2013 - 6/30/2013
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

Security Guard (Unarmed) 7 - 12 months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $13.10
Supplemental Benefit Rate per Hour: $4.37

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $13.35
Supplemental Benefit Rate per Hour: $4.54

Security Guard (Unarmed) 13 - 18 months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $13.60
Supplemental Benefit Rate per Hour: $4.37

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $13.85
Supplemental Benefit Rate per Hour: $4.54

Security Guard (Unarmed) 19 - 24 months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $14.10
Supplemental Benefit Rate per Hour: $4.37

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $14.35
Supplemental Benefit Rate per Hour: $4.54

Security Guard (Unarmed) 25 - 30 months

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $14.60
Supplemental Benefit Rate per Hour: $4.73

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $14.85
Supplemental Benefit Rate per Hour: $4.90

Security Guard (Unarmed) 31 months or more

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $14.75

Supplemental Benefit Rate per Hour: $4.73

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $15.15
Supplemental Benefit Rate per Hour: $4.90

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

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas 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: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $26.12
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: $26.44
Supplemental Benefit Rate per Hour: $9.51

Power Operated Scaffolds, Manual Scaffolds, and Boatswain Chairs

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $28.37
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $28.69
Supplemental Benefit Rate per Hour: $9.51

Window Cleaner Apprentice (0 - 3 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $19.35
Supplemental Benefit Rate per Hour: $0.00

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $19.59
Supplemental Benefit Rate per Hour: $0.00

Window Cleaner Apprentice (4 - 7 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $20.92
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $21.18
Supplemental Benefit Rate per Hour: $9.51

Window Cleaner Apprentice (8 - 11 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $22.17
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $22.44
Supplemental Benefit Rate per Hour: $9.51

Window Cleaner Apprentice (12 - 15 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $23.43
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $23.72
Supplemental Benefit Rate per Hour: $9.51

Window Cleaner Apprentice (16 - 17 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: $24.70
Supplemental Benefit Rate per Hour: $9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: $25.01
Supplemental Benefit Rate per Hour: $9.51

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 Birthday
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.....5 days
1 year but less than 5 years of service.....10 days
5 years of service but less than 15 years of service.....15 days
15 years of service but less than 21 years of service.....20 days
21 years.....21 days
22 years.....22 days

23 years.....23 days
24 years.....24 days
25 years or more of service.....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 Contract 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 (l) 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 (l/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.

I. 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. RESPONSIBILITIY - 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 (I) 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 employed 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.

J. 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 (l) part Portland Cement and one (l) 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 then 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 ½ 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

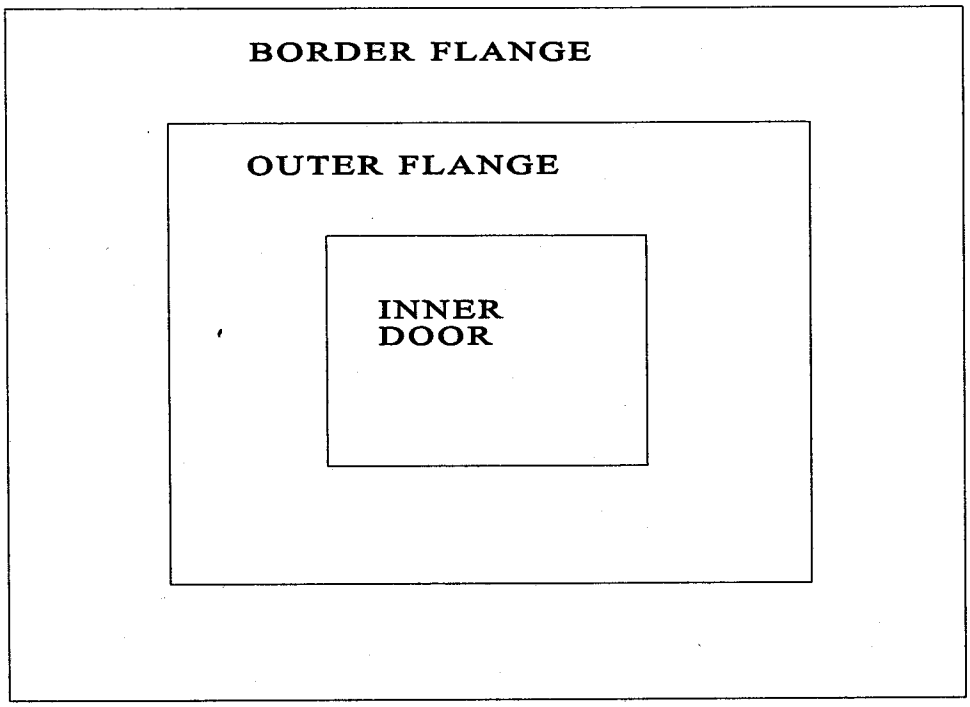
1. Panel boxes shall be fabricated from No. 12 USSG sheet steel of no more than three-piece construction, reinforced at the corners and with continuous welds. Boxes having a back whose area is larger than 16 square feet, shall be of No. 10 USSG sheet steel and reinforced to provide ample stiffness and 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 ½ 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 ½ horsepower or more, magnetic starters and circuit breakers shall be used. Single phase A.C. motors smaller than ½ horsepower or three-phase A.C. motors smaller than one (1) horsepower where manual control is specified may be furnished with starters of toggle switch or push button type with inbuilt thermal protection. No additional disconnecting means is required to be furnished with this type of starter. This type of starter may also be used in series with automatic control devices such as thermostats, float and pressure switches, provided the individual motor or the sum of fractional horsepower motors is less than ½ horsepower. Means for manual operation 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 ½" 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 ½"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 ½" 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' warrantees. 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 ½" 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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NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

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

Contractor

Dated _____, 20____

Approved as to Form
Certified as to Legal Authority

Acting Corporation Counsel

Dated _____, 20____

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____, 20____

FMS ID: **HL82SIABE**

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

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

Staten Island Animal Care and Control Center Reconstruction

LOCATION: **3139 Veterans Road West**
BOROUGH: **Staten Island 10309**
CITY OF NEW YORK

Minelli Construction Co., Inc.
Contractor

Dated October 2, 20 13

Approved as to Form
Certified as to Legal Authority

Acting Corporation Counsel

Dated February 14, 20 13

2.14.13

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____, 20 _____

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

PROJECT ID: HL82SIABE

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

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

VOLUME 3 OF 3

ADDENDUM TO THE GENERAL CONDITIONS

SPECIFICATIONS

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

Staten Island Animal Care and Control Center Reconstruction

LOCATION: 3139 Veterans Road West
BOROUGH: Staten Island 10309
CITY OF NEW YORK

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

Department of Health & Mental Hygiene

Garrison Architects

Date: January 8, 2013

13-004

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 #: ***HL82SIABE***

PROJECT NAME: ***STATEN ISLAND ANIMAL CARE AND CONTROL CENTER***

PROJECT DESCRIPTION: This Project consists of a new 5,065 SF single story building to replace the existing ACC facility on the same site. The building is to be built in two phases to allow continuous use of the facilities. The building is a steel frame structure with concrete block shear walls. The lower portion of the exterior has fixed aluminum louvers and multi-wall polycarbonate panels above. The aluminum louvers are backed by CMU knee walls and intermittent motorized dampers. There is also a small amount of ground face CMU on the exterior wall at the service area. Besides the steel framed glass entry volume, there is very limited exterior glazing. The frame of the glass entry volume is clad in anodized aluminum. Exterior doors are steel or aluminum frame storefronts.
The steel frame sits on a concrete slab on grade. The three roof top package units and two split system condensing units sit on the lower portion of the flat roof. The upper portion of the flat roof is free of equipment. There are extensive floor drains, sinks and spigots. Piping for plumbing fixtures is concealed below the slab or in the walls where possible. There is a closed loop fire alarm system. A sprinkler system is included in scope.
The majority of the lighting is surface mounted with recessed lighting at false ceiling areas only. Electrical wiring and outlets are concealed or recessed where possible.
Interior walls are CMU and the floor is epoxy-coated concrete except at bathrooms which are tiled. Some CMU walls have a multi-wall polycarbonate clerestory. The metal spiral ducts, metal deck and steel structure are exposed and painted throughout. There are multi-wall polycarbonate panel ceilings at three small service rooms. Areas above these ceilings are exposed to view from adjacent rooms. Various sealants are specified at floors and walls. Interior doors are steel, some with glazing and side lights.
A pantry, reception desk, moveable cages and miscellaneous medical tables and desks are part of the base building package as indicated in the documents. Other furnishings, including office desks and chairs and medical tables and equipment are to be provided by the City of New York. Interior signage is required and details provide under separate cover.
The exterior includes a new coated asphalt paved parking lot with six parking spaces and a gated loading and service area. Walkways are either poured concrete or concrete pavers and site walls are ground face CMU or poured concrete. A water jet cut stone memorial plaque is incorporated into the site walls and a stone bench is incorporates into the low court. Fenced-in, concrete paved dog runs and holding cages are incorporated into the rear of the site. The site requires re-grading and incorporates plantings and grasses throughout. Trees are to be removed, protected and relocated or replaced as indicated. Site drains are located throughout the site and a subsurface drywell system is located below the parking. Site lighting is incorporated throughout. Site signage is included. Details for signage graphics is indicated in the signage package, under separate cover.

PROJECT LOCATION: ***3139 Veterans Road West***
BOROUGH: ***Staten Island***
CITY OF NEW YORK
ZIP CODE: ***10309***
COMMUNITY BOARD #: ***503***

PROJECT MANAGEMENT:

[X] 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.

Article No.	Article		Sub-Article or PART (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		
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		

Article No.	Article		Sub-Article or PART (if applicable)	Applies		Does not Apply		Applies as Amended
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				
		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: 1

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.

Special Requirements - Article 1.42 S:

The Contractor is to provide the Project in two (2) phases as indicated in the Construction Documents. Phase 1 Partial Demolition shall not impact the operation of the existing facility beyond the extent of demolition indicated in the drawings. The Contractor is to furnish and install protection, signage and temporary construction as required to provide the existing building with a code compliant temporary entrance for the duration of Phase 1.

For the duration of Phase 1, the existing building is to remain fully accessible and in full operation.
As part of Phase 1, the new facility must be water tight and fully enclosed including the one hour fire rated temporary wall. All systems must be in full operation at the end of Phase 1.

As part of Phase 1, the Contractor is to provide all temporary elements, work and protection as required to obtain a Temporary Certificate of Occupancy for the new facility. The Fire Alarm contractor is to provide a letter of defect. Upon completion of Phase 1, the GC is to install the City of New York furnished equipment and furnishings as indicated in the Phase One plans. Moving of the existing furnishings and equipment is to be coordinated by the Contractor with the city of New York.
Phase 2 work, including Phase 2 demolition shall commence after written approval by the City of New York is provided.

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. Special Experience Requirement #1 applies to the contractor or subcontractor that will perform specific areas of work specified in the sections set forth below.

General Construction Work:

- Section 024119: Selective Demolition and Alteration Work
- Section 051200: Structural Steel
- Section 074196: Polycarbonate Exterior Panels

(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. Special Experience Requirement #2 applies to the contractor or subcontractor that will perform specific areas of work specified in the sections set forth below.

General Construction Work:

- Section 075200: Modified Bitumen Roofing

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	480 CCD	
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 Subcontactor 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
■ Commercial General Liability Art. 22.1.1	$ 1,000,000 per occurrence $ 2,000,000 aggregate (applicable separately to this **Project**) Additional Insureds: 1. City of New York, including its officials and employees, and
■ Workers' Compensation Art. 22.1.2 ■ Disability Benefits Insurance Art. 22.1.2 ■ Employers' Liability Art. 22.1.3 □ Jones Act Art. 22.1.4 □ U.S. Longshoremen's and Harbor Workers Compensation Act Art. 22.1.4	Workers' Compensation: Statutory per New York State law without regard to jurisdiction Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction Employers' Liability: $1,000,000 each accident
■ Builders' Risk Art 22.1.5 □ Installation Floater	Applicable to Builders' Risk or Installation Floater: 100 % of total value of **Work** City of New York and the **Contractor** named as Loss Payee for the **Work** in order of precedence, as their interests may appear. Note: 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.

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
■ Comprehensive Business Auto Coverage Art. 22.1.6	$ 1,000,000 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
□ Pollution/Environmental Liability Art. 22.1.7	$_____ per occurrence $_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
□ Marine Protection and Indemnity Art. 22.1.8(a)	$ NA per occurrence $ NA 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.

☐ Ship Repairers Legal Liability Art. 22.1.8(b)	$__NA_____ each occurrence [Contracting agency to fill in total value of City vessels involved]
☐ 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. _____
☐ Marine Pollution Liability Art. 22.1.8(d)	$__NA_____ each occurrence Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.9 ☐ Railroad Protective Liability _____	$__NA_____ 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.

[OTHER] ■ Asbestos Liability	Art. 22.1.9	Only required of the Contractor or Subcontractor performing any required asbestos removal. $1,000,000 each occurrence, $2,000,000 aggregate (Combined Single Limit); Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] ■ Boiler Insurance	Art. 22.1.9	$200,000
[OTHER] ■ Professional Liability In the event any section of the Specifications requires the Contractor to engage a Professional Engineer to provide design and/or engineering services, the Engineer engaged by the Contractor, as well as any sub consultant(s) performing professional services, shall provide Professional Liability Insurance.	Art. 22.1.9	$1,000,000 per occurrence The Contractor's Professional Engineer shall maintain and submit evidence of Professional Liability Insurance in the minimum amount of $1,000,000 per claim. The policy or policies shall include an endorsement to cover the liability assumed by the Contractor under this Agreement arising out of the negligent performance of professional services or caused by an error, omission or negligent act of the Contractor's Professional Engineer or anyone employed by the Contractor's Professional Engineer. Claims-made policies will be accepted for Professional Liability Insurance. All such policies shall have an extended reporting period option or automatic coverage of not less than two (2) years. If available as an option, the Contractor's Professional Engineer shall purchase extended reporting period coverage effective on cancellation or termination of such insurance unless a new policy is secured with a retroactive date, including at least the last policy year.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART 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.

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WARRANTY FROM MANUFACTURER

(1) Contractor's Obligation to Provide Warranties: The items of material and/or equipment for which manufacturer warranties are required are listed below. For each item of material and/or equipment listed below, the Contractor shall obtain a written warranty from the manufacturer. Such warranty shall provide that the material or equipment is free from defects for the period set forth below and will be replaced or repaired within such specified period. The Contractor shall deliver all required warranties to the Commissioner.

(2) Required Warranties:

Specification Number	Material or Equipment	Warranty Period (Min)
019113	LEED Building Commissioning	one (1) year
071326	Sheet Membrane Waterproofing (MF)	three (3) years
071326	Sheet Membrane Waterproofing (Installer)	two (2) years
074196	Polycarbonate Exterior Panels (MF)	five (5) years
074196	Polycarbonate Exterior Panels (Installer)	five (5) years
074243	Aluminum Composite Wall Panels (MF)	two (2) years
074243	Aluminum Composite Wall Panels (finish)	twenty (20) years
074196	Polycarbonate Exterior Panels (finish)	twenty (20) years
075200	Modified Bitumen Roofing (MF)	twenty (20) years
075200	Modified Bitumen Roofing (installer)	two (2) years
076200	Sheet Metal Work	ten (10) years
084113	Aluminum Entrances Storefront	three (3) years

084113	Aluminum Entrances Storefront (finish)	twenty (20) years
084228	All Glass Doors	two (two) years
087100	Door Hardware (manual door closers)	ten (10) years
087100	Door Hardware (locks)	five (5) years
087100	Door Hardware (exit devices)	five (5) years
087100	Door Hardware (electromechanical)	two (2) years
088000	Glass and Glazing (coated glass products)	five (5) years
088000	Glass and Glazing (insulating glass)	ten (10) years
088000	Glass and Glazing (laminated glass)	five (5) years
089000	Louvers and Vents (finish)	twenty (20) years
220500	Plumbing Work	one (1) year
223400	Fuel-Fired Domestic Water Heater	one (1) year
230500	Mechanical Work	one (1) year
230503	Pipe and Fittings (refrigerant)	one (1) year
230593	T.A.B. – Mechanical	one (1) yr/ full
seasons		
233000	Ductwork and Accessories (subduct riser)	two (2) years
237432	Packaged Rooftop Units (parts, materials, workmanship)	one (1) year (start up) OR 18 months (ship
date)		
237432	Refrigeration System (compressor)	five (5) years
237432	Stainless Steel Heat Exchanger Furnace	twenty-five (25) years
237432	Energy Recovery Wheel Cassette	five (5) years
238126	Variable Refrigerant Flow Zoning Split System (MF)	one (1) year
238126	V.R.F.Z.S.S. (compressor)	six (6) years
238220	Air Curtain – heated (MF)	eighteen (18) months
263600	Automatic Transfer Switches	-
266510	Fire Alarm System	one (1) year
329300	Plantings	two (2) year

(3) Application: The obligations under the warranty for the periods specified above shall apply only to the manufacturer of the material or equipment, and not to the Contractor or its Surety; provided, however, the Contractor retains responsibility for obtaining all required warranties from the manufacturers and delivering the same to the Commissioner.

(4) Other Provisions: The warranty requirements set forth in this Schedule B are also included in the Specifications.

(a) In the event of any conflict between a warranty requirement set forth in the Specifications and a warranty requirement set forth in Schedule B, the warranty requirement set forth in Schedule B shall take precedence.

(b) In the event a warranty requirement set forth in the Specifications is omitted from Schedule B, such omission from Schedule B shall have no effect and the Contractor's obligation to provide the manufacturer's warranty, as set forth in the Specifications, shall remain in full force and effect

(c) In the event a warranty requirement for a particular item of material or equipment is omitted from both Schedule B and the Specifications, and the manufacturer of such item actually provides a warranty, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by that manufacturer.

(d) In the event a warranty requirement is provided for a particular item of material or equipment, and such requirement specifies a warranty period that is longer than that which is actually provided by any of the specified manufacturers, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by any of the specified manufacturers, unless otherwise directed in writing by the Commissioner.

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.

A-000.00	Cover Sheet
A-001.00	General Notes, Drawings List & Abbreviation
A-002.00	Code / Zoning Analysis
A-003.00	Survey

CIVIL

C-001.00	General Notes and Details
C-002.00	Internal Storm and Sanitary Drainage
C-003.00	Builder's Pavement Plant
C-004.00	Erosion & Sediment Control Notes & Details
C-005.00	Erosion & Sediment Control Plan

ARCHITECTURAL

A-010.00	Demolition Plan
A-011.00	Demolition Phasing Plans
A-012.00	Phasing Detail
A-020.00	Site Plan
A-021.00	Site Plan - Materials
A-022.00	Site Plan - Grading & Planting Plan & Details
A-100.00	Plan – Dimensions, Area Chart & Egress Diagram
A-101.00	Plan – Notes, Furniture & Equipment
A-102.00	Plan - Transom Level
A-103.00	Plan - Reflected Ceiling
A-104.00	Plan - Roof
A-200.00	Elevations
A-300.00	Building Sections
A-301.00	Building Sections
A-400.00	Interior Elevations
A-401.00	Interior Elevations
A-402.00	Interior Elevations
A-403.00	Interior Elevations
A-404.00	Interior Elevations
A-405.00	Interior Elevations
A-406.00	Interior Elevations
A-407.00	Interior Elevations
A-500.00	Typical Wall Sections
A-501.00	Cattery / Entry Int. Elevation and Detail Plan
A-502.00	Cattery / Entry Section and Detail Plan
A-503.00	Cattery / Entry Ext. Elevation and Detail RCP
A-504.00	Entry Wall Section
A-601.00	Details – Exterior
A-602.00	Details - Polycarbonate Wall System
A-603.00	Details - Cattery and Entry
A-604.00	Details - Cattery and Entry
A-605.00	Details - Plan Details and Cattery and Entry
A-606.00	Details – Roof & Misc. Penetrations
A-607.00	Details - Ceiling
A-610.00	Details – Cabinetry & Furniture
A-620.00	Exterior Details - Fencing
A-621.00	Exterior Details
A-622.00	Exterior Details
A-700.00	Schedules
A-701.00	Wall Types and CMU Site Wall Detail
A-702.00	Door Details

STRUCTURAL

S-100.00	First Floor Slab Control Joint Plan
S-101.00	Foundation & First Floor Plan
S-102.00	Top of Wall Plan
S-103.00	Main Roof Framing Plan
S-104.00	Clerestory Roof Framing Plan
S-105.00	Elevations
S-200.00	Foundation Sections and Details
S-201.00	Building and Wall Sections
S-300.00	Sections
S-301.00	Building & Wall Sections @ Cattery
S-302.00	Sections
S-400.00	Column Schedule
S-500.00	General Notes
S-501.00	Typical Sections
S-600.00	Phasing Floor Plan

MECHANICAL

M-001.00	Mechanical Symbols, General Notes & Abbrev's
M-101.00	First Floor Mechanical Plan
M-102.00	Roof Mechanical Plan
M-401.00	Mechanical Schedules
M-501.00	Mechanical Details
M-502.00	Mechanical Details

(cont'd)

ENERGY CODE

EN-001.00	Energy Code Compliance Sheet
EN-002.00	Energy Code Compliance Progress Inspection Sheet

ELECTRICAL

E-001.00	Electrical Symbols & Abbreviations
E-002.00	Electrical General Notes
E-101.00	First Floor Electrical Plan
E-102.00	Electrical Roof Plans
E-201.00	First Floor Lighting Plan & Light Fixt. Schedule
E-301.00	Electrical Power Riser Diagram
E-401.00	Electrical Panel Board Schedule
E-402.00	Electrical Equipment Schedule

PLUMBING

P-001.00	Plumbing Legend, Notes, Schedule & Plot Plan
P-101.00	Underground Plumbing Plan
P-102.00	First Floor Plumbing Plan
P-103.00	Roof Plumbing Plan Detail
P-200.00	Plumbing Riser Diagrams
P-201.00	Sanitary Riser Diagrams
P-202.00	Plumbing Riser Diagrams
P-300.00	Plumbing Details (Sheet 1 of 2)
P-301.00	Plumbing Details - BFP Installation (Sheet 2 of 2)

FIRE PROTECTION – FIRE ALARM

FA-001.00	Fire Alarm Symbols, Abbreviations and Notes
FA-101.00	First Floor Fire Alarm Plan
FA-301.00	Fire Alarm Riser Diagram

FIRE PROTECTION – SPRINKLER

SP-001.00	Sprinkler Legend, Notes, Schedules & Plot Plan
SP-101.00	First Floor Sprinkler Plan
SP-200.00	Sprinkler Riser Diagram and Details

ASBESTOS ABATEMENT

H-001.00	Asbestos Abatement General Notes
H-002.00	Asbestos Abatement First Floor Plan
H-003.00	Asbestos Abatement Roof Plan

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)
TS Thermal Switch
MS Magnetic Starter
CMS Comb. Mag. Starter
P Pilot Light
F Firestat
T Thermostat
AL Alternator
BG Break Glass Station
HOA Hand-Off Auto.
PB Push Button Station
RO Remote "off"

Equip. Ident.	Location	# of Units	HP or KW	Volts and Phase	Control Type: See legend above	Remarks:
RTU-1	ROOF	1	82 AMPS	208/3	CMS	
RTU-2	ROOF	1	82 AMPS	208/3	CMS	
RTU-3	ROOF	1	88 AMPS	208/3	CMS	
ACC-1	ROOF	1	24 AMPS	208/3	CMS	
ACC-2	ROOF	1	1.8 AMPS	208/1	CMS	
AC-1, AC-5, AND AC-6	SEE PLANS	3	70 WATTS	208/1	DB	
AC-2, AC-3, AND AC-4	SEE PLANS	3	30 WATTS	208/1	DB	
AC-7	SURGICAL SUITE	1	3/4HP	208/1	CMS	
F-1	ROOF	1	1/15 HP	120/1	DB	

F-2	INTAKE AREA	1	83 WATTS	120/1	DB	
F-3	FOOD PREP ROOM	1	80 WATTS	120/1	DB	
F-4	ROOF	1	1/3 HP	208/1	CMS	
FPT-1	CATTERY WINDOW	1	1/4 HP	208/1	DB	
DHW-1	MECH ROOM	1	15 AMPS	115/1	DB, BG	
CP-1	MECH ROOM	1	1/12 HP	115/1	DB	

SCHEDULE E

Separation of Trades

(Reference: Article 1.40 of the General Conditions)

NO TEXT

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: Garrison Architects
TELEPHONE NUMBER: 718 596 8300
DDC PROJECT MANAGER: Moses Ros
TELEPHONE NUMBER: 718 391 1681

DATE: _____

APPROVED: _____
(DDC RESIDENT ENGINEER/CPM)

REPORT DATE		FMS ID #/PROJECT ID #: HL82SIABE CONTRACT REGISTRATION #: PROJECT NAME: Staten Island Animal Care and Control Center							TRADE: SHOP DRAWING LOG SHEET #			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
013329	LEED SUBMITTALS INCLUDING COST DATA, ACTION PLANS, PROGRESS REPORTS, SPREADSHEETS, LEED CREDIT TEMPLATES, ETC	X	X	X	X												
019113	COMMISSIONING	X	X														
022000	UNDERPINNING & TEMP SHORING	X	X														
024116	BUILDING DEMOLITION PLAN INCLUDING PROCEDURES & SEQUENCING	X	X (OR EQ)														
024119	TEMPORARY DUSTPROOF & WEATHERPROOF PARTITIONS	X	X	X	X												

032400	FIBROUS REINFORCING	X			X												
033000	CAST-IN-PLACE CONCRETE – INCLUDING REINFORCEMENT	X	X		X												
033000	CAST-IN-PLACE CONCRETE – ACCESSORIES, ADMIXTURES, COMPOUNDS, WATERSTOPS, ETC	X		X	X												
033010	CONCRETE DESIGN MIX	X	X														
042000	UNIT MASONRY – UNITS TYPES & LOCATIONS	X	X														
042000	UNIT MASONRY – CONTROL JOINTS	X		X	X												
042000	UNIT MASONRY - REINFORCING	X		X	X												
042000	UNIT MASONRY & MORTAR – INITIAL SELECTION	X		X													
042000	UNIT MASONRY & MORTAR – VERIFICATION	X		X													
042000	UNIT MASONRY – ACCESSORIES	X	X	X													
042000	UNIT MASONRY - FLASHING	X	X	X	X												
051200	STRUCTURAL STEEL INCLUDING ERECTION	X	X		X												
051200	STRUCTURAL STEEL – HIGH STRENGTH BOLTS & PAINTS	X	X		X												
053000	METAL DECK	X	X		X												
054000	COLD FORMED METAL FRAMING	X	X		X												
055000	MISC. METALS	X	X		X												
055000	MISC. METALS - ANODIZED	X	X		X												
062023	CARPENTRY & MILLWORK	X	X	X	X												
071326	SHEET MEMBRANE WATERPROOFING	X	X	X	X												
072100	THERMAL INSULATION	X		X	X												

072700	AIR AND VAPOR BARRIER MEMBRANE	X		X	X												
074196	POLYCARBONATE EXTERIOR PANELS	X	X	X	X												
074223	PREFORMED WOOD EXTERIOR CEILING PANELS	X	X	X	X												
074243	ALUMINUM COMPOSITE WALL PANELS	X	X	X	X												
075200	MODIFIED BITUMENN ROOFING	X			X												
076200	SHEET METAL WORK	X	X	X	X												
077100	ROOF SPECIALTIES & ACCESSORIES	X	X		X												
078413	FIRESTOPS & SMOKESEALS	X	X		X												
079200	JOINT SEALERS	X	X	X	X												
079500	EXPANSION CONTROL	X	X	X	X												
081113	STEEL DOORS & FRAMES	X	X	X	X												
081119	STAINLESS STEEL DOORS & FRAMES	X	X	X	X												
083113	ACCESS DOORS	X			X												
084113	ALUMINUM ENTRANCES & STOREFRONTS	X	X	X	X												
084228	ALL GLASS DOORS	X	X	X	X												
08710	DOOR HARDWARE	X	X	X	X												
088000	GLASS & GLAZING	X		X	X												
089000	LOUVERS & VENTS	X	X	X	X												
092900	DRYWALL	X	X	X	X												
093000	CERAMIC TILE	X		X	X												
095150	WOOD COMPOSITE CEILING PANELS	X	X	X	X												

096723	EPOXY/ RESINOUS SEALANTS & COATINGS	X		X	X												
099000	PAINTING AND FINISHING	X		X	X												
101400	SIGNAGE	X	X	X	X												
102800	TOILET ACCESSORIES	X	X		X												
104416	FIRE EXTINGUISHERS & CABINETS	X		X	X												
105113	LOCKERS	X	X		X												
114520	STAINLESS STEEL COUNTERS	X	X	X													
128414	FLOOR MATS & FRAMES	X		X	X												
131915	ANIMAL CAGES	X	X		X												
211000	WATER-BASED FIRE SUPPRESSION SYSTEMS	X	X		X												
220500	COMMON PLUMBING WORK RESULTS	X															
220503	PIPES & TUBES - PLUMBING	X	X		X												
220523	GENERAL DUTY VALVES - PLUMBING	X	X		X												
220548	VIBRATION, NOISE, SEISMIC CONTROL – PLUMBING PIPING & EQUIPMENT	X	X		X												
220553	PLUMBING IDENTIFICATION	X	X		X												
220700	PLUMBING INSULATION	X			X												
221100	FACILITY WATER DISTRIBUTION	X	X		X												
221300	FACILITY SANITARY SEWAGE	X	X		X												
221400	FACILITY STORM DRAINAGE	X	X		X												
223400	DOMESTIC HOT WATER HEATER	X			X												

224000	PLUMBING FIXTURES	X			X												
230500	BASIC MECHANICAL REQUIRMENTS	X			X												
230503	PIPE & FITTINGS	X	X		X												
230513	MOTORS	X			X												
230514	MOTOR STARTERS & WIRING	X			X												
230529	SUPPORTS & ANCHORS	X	X		X												
230548	VIBRATION ISOLATION & SEISMIC RESTRAINT	X			X												
230553	MECHANICAL IDENTIFICATION	X			X												
230593	TAB – MECHANICAL SYSTEMS	X	X														
230700	MECHANCIAL INSULATION	X			X												
230800	COMMISSIONING	X															
232300	REFRIGERANT PIPING	X	X		X												
233000	DUCTWORK & ACCESSORIES	X	X		X												
233400	FANS	X	X		X												
233700	AIR OUTLETS & INLETS	X	X		X												
234100	PARTICULATE AIR FILTRATION	X	X		X												
237432	PACKAGED ROOFTOP UNITS	X	X		X												
237435	SURGERY ROOM AIR CONDITIONING UNIT	X	X		X												
238126	ELECTRIC HEATING	X	X		X												
238200	HEATING TERMINAL UNITS	X	X	X	X												
238220	AIR CURTAINS	X	X		X												
260500	COMMON WORK RESULTS FOR ELECTRICAL	X			X												

260519	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES	X			X												
260526	GROUNDING & BONDING FOR ELECTRICAL SYSTEMS	X	X		X												
260529	HANGERS & SUPPORTS FOR ELECTRICAL SYSTEMS	X			X												
260533	RACEWAYS & BOXES	X			X												
260548	VIBRATION & SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS	X	X		X												
260553	ELECTRICAL IDENTIFICATION	X															
260923	LIGHTING CONTROL DEVICES	X			X												
262200	LOW VOLTAGE TRANSFORMERS	X	X		X												
262416	PANEL BOARDS	X	X		X												
262417	SELECTION OF OVERCURRENT DEVICES	X			X												
262713	ELECTRICITY METERING	X			X												
262726	WIRING DEVICES	X			X												
262813	FUSES	X			X												
262600	ENCLOSED SWITCHES	X			X												
262600	AUTOMATIC TRANSFER SWITCHES	X	X		X												
266510	FIRE ALARM SYSTEM	X	X		X												
321000	BASES, BALLASTS & PAVING	X			X												
321216	BITUMINOUS PAVEMENT	X			X												
321223	ASPHALT COATINGS	X		X	X												
321313	CONCRETE WALKS & CURBS	X			X												

321413	PRECAST CONCRETE PAVERS	X		X	X												
323119	ORNAMENTAL FENCING	X	X	X	X												
329300	PLANTINGS	X	X		X												
333000	SANITARY SEWAGE UTILITIES	X	X		X												
334000	STORM DRAINAGE UTILITIES	X	X		X												

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CONTRACT # 1

GENERAL CONSTRUCTION WORK

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SECTION 013329

LEED SUBMITTALS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete submittal requirements as specified herein, including, but not limited to, the following:

1. LEED building submittal requirements.

1.3 RELATED SECTIONS

A. Construction Waste Management - Section 017419.

B. LEED Requirements - Section 018113.

C. Environmental Practices - Section 018116.

D. Construction IAQ Management - Section 018119.

E. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

1.4 DEFINITIONS

A. LEED: Leadership in Energy & Environmental Design.

B. Rapidly Renewable Materials: Materials made from plants that are typically harvested within a 10-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.

C. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within a 500 radius miles of the Project site. If only a fraction of a product or material is extracted/harvested/recovered locally, then only that percentage (by weight) shall contribute to the regional value.

D. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

1. "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.

2. "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

3. Do not include mechanical and electrical components in the calculation of recycled content.

E. FSC Certified Content: Wood content that has been harvested in accordance with the "FSC Principles and Criteria" for well-managed forests developed by the Forest Stewardship Council (FSC).

F. Salvaged Content: Materials (from another building) that have been salvaged, refurbished, or reused.

G. Green Building Focus Materials (GBFM): Materials within the individual Sections for which there are specific LEED requirements, such as minimum recycled content or required reporting of recycled and/or regional content.

1.5 REFERENCES AND REGULATORY REQUIREMENTS

A. General: Comply with the applicable provisions of the referenced standards except as modified by governing codes and the Contract Documents. Where a recommendation or suggestion occurs in the referenced standards, such recommendation or suggestion shall be considered mandatory. In the event of conflict between referenced standards, this specification or within themselves, the more stringent standard or requirement shall govern.

1. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE).

2. Carpet and Rug Institute (CRI)

3. Environmental Protection Agency (EPA).

4. Forest Stewardship Council (FSC).

5. Green Seal (GS)

6. Illuminating Engineering Society of North America (IESNA).

7. Sheet Metal and Air Conditional National Contractor Association (SMACNA).

8. South Coast Air Quality Management District (SQAMD)

9. United States Green Building Council (USGBC): Leadership in Energy and Environmental Design (LEED™) Green Building Rating System, Version 2.0/2.2.

B. Rule 1168 – "Adhesive and Sealant Applications", effective date of July 1, 2005 and Rule Amendment date of January 7, 2005: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov

C. Green Seal Standard for Commercial Adhesives GS-36, requirements in effect October 19, 2000.

D. "Green Seal Standard for Architectural Coating" (GS-11), plus "Green Seal Standard for Anti-Corrosive Paints" (GC-03).

E. Rule 1113 - :Architectural Coatings", amended 7/9/04: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov

F. SMA CNA IAQ guidelines for Occupied Buildings Under Construction, November 1995: The Steel Metal and Air Conditioner National Contractors Association. (703) 803-2980, http:/ / www.smacna.org.

G. ANSI / ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", www.ashrae.org

1.6 SUBMITTALS

A. Additional LEED submittals as required by other Specification Sections.

B. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.

C. Project Materials Cost Data: Provide statement indicating total cost for building materials used for Project, excluding mechanical, electrical, and plumbing components, and specialty items such as elevators and equipment. Include statement indicating total cost for wood-based materials used for Project and total cost for field-applied adhesives, sealants paints and coatings used for interior applications on the project.

D. LEED Action Plans: Provide preliminary submittals within 30 days of date established for commencement of the Work indicating how the following requirements will be met:

1. Prerequisite SS 1: Erosion and Sedimentation Control Plan. Indicate what ESC for site work measures are anticipated and how they will be documented.

2. Credit MR 2.1 and Credit MR 2.2: Waste Management Plan complying with Division 01 Section "Construction Waste Management and Disposal."

3. Credit MR 4.1 and Credit MR 4.2: Recycled Content Plan with list of proposed materials with recycled content. Indicate material cost (without labor and

equipment), post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.

4. Credit EQ 3.1: Construction IAQ Management Plan

   a. A copy of the draft and final versions of the Construction IAQ Management Plan as defined below as defined in Division 1 Section Construction Indoor Air Quality Management Plan.
   b. A construction schedule outlining the start-up date and expected duration of all Construction IAQ Management Plan control measures.

5. Credit EQ 4.4: Low Emitting Materials Composite Wood and Laminating Materials: with list of proposed composite wood, engineered wood or agrifiber products. Indicate each product, including its manufacturer and whether it contains added urea-formaldehyde resins. Indicate each laminating adhesive, including its manufacturer and whether it includes urea-formaldehyde resins.

E. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

1. Credit MR 2.1 and Credit MR 2.2: Waste reduction progress reports complying with Division 01 Section "Construction Waste Management and Disposal."

2. Credits EQ 4.1 and EQ 4.2: Low Emitting Materials Adhesives, Sealants, Paints and Coatings progress reports. Provide an updated spreadsheet to track the VOC content of adhesives, sealants, paints and coating supplied under all divisions.

3. Credit EQ 4.4: Low Emitting Materials Composite Wood and Laminating Materials Provide an updated spreadsheet to track engineered and composite wood, agrifiber materials and laminating adhesives regarding the use of added urea-formaldehyde resins.

F. LEED DOCUMENTATION SUBMITTALS:

Items 1-12 below define the information and documents to be provided for each type of Green Building Submittal.

1. Green Building Materials Certification Form (GBMCF): Information to be supplied on this form (blank copy attached at end of this Section) shall include some or all of the following items, as identified in each specification section:

   a. Cost breakdowns for the materials included in the contractor or sub-contractor's scope of work. Cost reporting shall include the total cost for the contractor's work, plus itemized material costs (excluding the contractor's labor, equipment, overhead and profit).
   b. The percentages (by weight) of post-consumer and/or post-industrial recycled content in the supplied product(s).
   c. Identification of materials manufactured and harvested or extracted within a 500 mile radius of the project site, or if the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies, if applicable.

d. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins.
e. Identification of FSC-certified wood products, if applicable.
f. Identification of rapidly renewable materials, if applicable.
g. Volatile Organic Compound (VOC) content of all field-applied adhesives, sealants, paints, and coatings, listed in grams/liter or lbs. /gallon.

2. GBMCF Back-up Documentation: These documents are used to validate the information provided on the GBMCF (except cost data). For each material listed on the GBMCF, provide documentation to certify the material's Green Building attributes, as applicable:

a. Recycled content: Provide published product literature or letter of certification on the manufacturer's letterhead certifying the amounts of post-consumer and/or post-industrial content, if applicable.
b. Regional manufacturing (within 500 mile radius): Provide published product literature or letter of certification on the manufacturer's letterhead indicating the city/state where the manufacturing plant is located and the direct distance in miles from the project site.
c. Regional raw materials (within 500 mile radius):
   1). Provide published product literature or letter of certification on the manufacturer's letterhead indicating the city/state from which each of the raw materials in the product were extracted, harvested recycled or recovered, and the direct distance in miles from the project site.
   2). If only some of the raw materials for a particular product or assembly originate within 500 miles of the project site, provide the percentage (by weight) that these materials comprise in the complete product.
d. Rapidly renewable resources: Provide published product literature or letter of certification on the manufacturer's letterhead indicating the rapidly renewable content in the installed product
e. FSC Certified Wood:
   1). Provide vendor invoices for each wood product that has been harvested in accordance with the "FSC Principles and Criteria" for well-managed forests developed by the Forest Stewardship Council (FSC) of Bonn, Germany. Invoices shall include itemized costs for all certified products.
   2). For assemblies, provide the percentage (by cost and by weight) of the assembly that is FSC-certified wood.
f. VOC content: Provide Material Safety Data Sheets (MSDS) certifying the Volatile Organic Compound (VOC) content of the adhesive, sealant, paint, or coating products. VOC content is to be reported in grams/liter or lbs. /gallon. If the MSDS does not show the product's VOC content, this information must be provided through other published product literature from the manufacturer, or stated in a letter of certification from the product manufacturer on the manufacturer's letterhead.

3. PRODUCT CUT SHEETS: Provide product cut sheets with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project.

4. CRI LEED LABEL CERTIFICATION: For carpets and carpet cushions, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the "Green Label Plus" IAQ testing program of the Carpet and Rug Institute of Dalton, GA.

5. CARPET COMPONENT IDENTIFICATION: For all synthetic carpets, provide documentation from the manufacturer (on the manufacturer's letterhead) of the specific carpet component identification code that is printed on, or attached to, the carpet supplied for the project. The code must identify the carpet face fiber, and may identify its primary backing, secondary backing, adhesive, adhesive filler, and dyes.

6. CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER RESINS: For all composite wood, engineered wood, agrifiber products and laminating adhesives, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that that the products do not contain added urea-formaldehyde or phenol-formaldehyde resins.

7. GREEN SEAL COMPLIANCE: Provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the following product types comply with the VOC limits and chemical component restrictions developed by the Green Seal organization of Washington, DC:

   a. Topcoat paints: refer to Green Seal standard GS-11 (1st edition, May 1993)
   b. Anti-corrosive and Anti-rust paints: refer to Green Seal standard GC-03 (2nd Edition, January 1997)
   c. Aerosol Adhesives: refer to Green Seal standard GS-36 (1st edition, October 2000)

8. ENERGY STAR LABEL CERTIFICATION: For applicable appliances, office equipment, electronics, and commercial food service equipment, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products are rated under the U.S. EPA/DOE EnergyStar program.

9. HIGH ALBEDO ROOFING MATERIALS: For exposed roofing membranes, pavers, and ballast products, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following minimum Solar Reflectance Index (SRI) values:

   a. 79 low-sloped roofing applications (slope $\leq$ 2:12)
   b. 29 for steep-sloped roofing applications (slope $\geq$ 2:12)
   c. SRI values shall be calculated according to ASTM E 1980. Reflectance shall be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance shall be measured according to ASTM E 408 or ASTM C 1371.
   d. Vegetated roof surfaces are exempt from the SRI criteria.

10. HIGH ALBEDO PAVING AND WALKWAY MATERIALS: For paving and walkway materials made from concrete or brick provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying a minimum Solar Reflectance Index (SRI) value of 29. SRI values shall be calculated according to ASTM E 1980. Reflectance shall be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance shall be measured according to ASTM E 408 or ASTM C 1371.

11. LOW MERCURY LAMPS: For all fluorescent, compact fluorescent, and HID lamps installed in the project, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying:

    a. The mercury content or content range per lamp in milligrams or picograms;
    b. The design light output per lamp (light at 40% of a lamp's useful life) in lumens; and
    c. The rated average life of the lamp in hours.
    d. In addition, provide the total number of each lamp type installed in the project.

12. GREENGUARD CERTIFICATION: For systems furniture and seating, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products are certified by the GreenGuard Environmental Institute of Atlanta, GA.

G. Green Building Submittal Packages: The Green Building Submittal information shall be assembled into one (1) package per Specification section or sub-contractor. Two (2) copies of the submittals are required. Incomplete or inaccurate Green Building Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.7 QUALITY ASSURANCE

A. Contractor's Quality Control Responsibilities: Contractor is solely responsible for quality control of the Work.

B. Contractor's LEED Representative: Designate a Representative that is LEED Accredited by the USGBC. Contractor's LEED Representative shall oversee the sustainable building for the project, shall instruct workers concerning these goals, and shall be present on site when Work is in progress.

C. LEED Certification Meetings: Schedule and conduct LEED Certification meetings monthly. Meeting attendees shall include at least the following: City of New York's Representative, Commissioner, Contractor's Project Manager, Contractor's LEED Representative, and Sub-Contractor Representatives as appropriate to stage of Work. Also discuss LEED Certification at Pre-bid, Pre-construction, and regular job site meetings.

D. LEED Training Program: Provide environmental training for workers performing Work on the Project site. Training shall include the following:

1. Overview of environmental issues related to the building industry.

2. LEED Building System: Requirements for this project.

PART 2 PRODUCTS

2.1 RECYCLED CONTENT OF MATERIALS

A. Credit MR 4.1 and Credit MR 4.2: Provide required recycled content and/or report recycled content as indicated in the individual Sections.

2.2 REGIONAL MATERIALS

A. Credit MR 5.1 and Credit MR 5.2: Report regional content as indicated in the individual Sections.

2.3 LOW-EMITTING MATERIALS

A. A. Credits EQ 4.1 and EQ 4.2: Provide products conforming to the requirements of Division 01 Section Limitations on Volatile Organic Compound Contents for Adhesives, Sealants, Paints and Coatings

B. Credit EQ 4.4: Provide engineered wood and agrifiber products that do not contain added urea-formaldehyde resins. For adhering laminates and veneers, use only adhesives that do not contain added urea-formaldehyde resins.

2.4 SUBMITTAL REQUIREMENTS FOR COMMISSIONING

A. Normal Submittals

1. The Commissioning Agent will receive a copy of the normal submittals for equipment to be commissioned.

2. The Commissioning Agent will review and approve normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the A/E reviews.

B. Data for Commissioning: The Contractor will receive a written request from the Commissioning Agent requesting specific information needed about each of commissioned equipment or system. Include the following:

1. Detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of City of New York contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the City of New York to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Agent the Commissioning Agent may request.

PART 3 EXECUTION

3.1 COORDINATION OF SUBMITTALS

A. Prior to submittal for Commissioner's review, use all means necessary to fully coordinate all material, including the following procedures:

1. Determine and verify all field dimensions and conditions, materials, catalog numbers and similar data.

2. Coordinate as required with all trades and with public agencies involved.

3. Secure all necessary approvals from public agencies and others and signify by stamp, or other means that they have been secured.

4. Clearly indicate all deviations from the Contract Documents.

B. Unless otherwise specifically permitted by the Commissioner, make all submittals in groups containing all associated items; the Commissioner may reject partial submittals as not complying with the provisions of the Contract Documents.

3.2 EROSION AND SEDIMENTATION CONTROL (ESC)

A. Prerequisite SS 1: Comply with requirements for Construction Activity Pollution Prevention as outlined in the Sedimentation and Erosion Control Plan.

3.3 CONSTRUCTION WASTE MANAGEMENT (CWM)

A. Credit MR 2.1 and MR 2.2: Comply with Division 01 Section "Construction Waste Management and Disposal"

3.4 LEED MEASUREMENT AND VERIFICATION

A. Construction Waste Management (CWM) – Credit MR 2

1. Credit MR 2: Maintain spreadsheet tracking waste material description, hauler or recycling location and tabulation of material diverted or recycled based on weight or volume.

B. Use of materials with Recycled Content – Credit MR 2

1. Maintain a spreadsheet to track Recycled content of materials specified in Divisions 02-10 and 31-33. Include material description, material costs (without labor and equipment), post consumer recycled content, pre consumer recycled content and recycled content information source. Recycled content is based on the cost of qualifying materials as a percent of overall materials costs for Divisions 02 –10 and 31-33.

C. Use of Regional Materials Credit MR 5, if applicable

1. Maintain a spreadsheet to track Regional Materials specified in Divisions 02-10 and 31-33. Include the product name, manufacturer, material cost (without labor and equipment), direct line distance from project to extraction/harvest location, direct line distance from project ton manufacturer's location and source of information regarding harvest/extraction and manufacturing locations.

D. Low Emitting VOC Content Materials Credit EQ 4.1 and EQ 4.2

1. Maintain a spreadsheet of all adhesives, sealants, and sealant primers, paints and coatings used on the project. Include product manufacturer, product name/model,

VOC content, allowable VOC content as per referenced standard, the source of the VOC data, an estimated quantity of the product used on the project and an estimated cost for each product.

E. Low Emitting Carpet – Credit EQ 4.3

1. Maintain a spreadsheet of all installed carpets and carpet backings. Include manufacturer, recycled content, manufacturing location, and confirmation that the product meets the requirements of the CRI 'Green Label Plus' program. Maintain a listing of all carpet adhesives including the manufacturer, product name and VOC content as reported by the manufacturer.

F. Low Emitting Engineered Wood, Composite Wood and Agrifiber Board – Credit EQ 4.4

1. Maintain an updated spreadsheet to track engineered and composite wood, agrifiber materials and laminating adhesives. Include the product, manufacturer and indicate if the product contains added urea-formaldehyde resins.

END OF SECTION

SECTION 017419

CONSTRUCTION WASTE MANAGEMENT

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. LEED Requirements - Section 018113.

C. Environmental Practices - Section 018116.

D. Construction IAQ Management - Section 018119.

E. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

F. All sections of the Specifications involving demolition or construction activities.

1.3 SUMMARY

A. This Section includes requirements for Construction Waste Management (CWM), with criteria for recycling and/or salvaging demolition and construction waste generated during the project. A Construction Waste Management Plan shall be developed for approval by the City of New York and Commissioner. The Plan shall be implemented throughout the duration of the project, and shall be documented per the Submittal Requirements of this Section. Construction Waste Management is included as part of the LEED Building requirements for the project.

1.4 PROJECT WASTE MANAGEMENT REQUIREMENTS

A. The City of New York has established that this Project shall generate the least amount of waste possible, and that processes that ensure the generation of as little waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors shall be employed.

B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be returned, reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

C. Diversion Requirements: The end-of-project recycling rate shall equal, at minimum, 75% by weight of the total project waste from construction, demolition, and land clearing activities on site. Excavation soil and hazardous waste are excluded from the calculation.

D. Due to the nature and location of the Site, recycling on site may not be possible (to be determined by the Contractor). The Waste Contractor(s) should include off-site opportunities to recycle and reuse removed materials in the Construction Waste Management Plan.

1.5 CONSTRUCTION WASTE MANAGEMENT PLAN

A. The Contractor shall prepare and submit a Construction Waste Management Plan (CWM) to the City of New York and Commissioner for approval. The CWM Plan shall outline the provisions to be implemented to recycle and salvage demolition and construction waste generated during the project.

B. Upon approval of the CWM Plan by the City of New York and Commissioner, it shall be implemented throughout the duration of the project, and documented in accordance with the Submittal Requirements of this Section.

C. The CWM Plan shall include, but not be limited to, the following components:

1. *Listing of Targeted Materials*: Develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials shall be accounted for (materials that will not be recycled shall be indicated as such):

    a. Cardboard, paper, packaging.
    b. Clean dimensional wood, palette wood.
    c. Beverage containers.
    d. Land clearing debris.
    e. Concrete.
    f. Brick.
    g. Concrete Masonry Units (CMU).
    h. Asphalt.
    i. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
    j. Drywall.
    k. Carpet and pad.

l. Paint.
m. Asphalt roofing shingles if applicable for any existing building demolition.
n. Rigid foam.
o. Glass.
p. Plastics.

2. Landfill Information: Provide the name of the landfill(s) where trash will be disposed of and the applicable landfill tipping fee(s).

3. Sorting Method: Provide a description of the proposed means of sorting and transporting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting).

4. Packaging Waste: Provide an estimate of packaging materials generated, and note whether suppliers will eliminate or take back packaging.

5. Field Conditions: Include provisions in the Construction Waste Management Plan for addressing conditions in the field that do not adhere to the CWM Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

6. Recycling Facilities: Provide the name of the recycling facilities(s) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s).

7. Additional Information: Include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the City of New York and Commissioner.

D. Subcontractor Requirements: Construction Waste Management and recycling requirements shall be incorporated into all subcontractor's contracts.

1.6 SUBMITTAL REQUIREMENTS

A. The Contractor and/or Subcontractors shall submit the following LEED BUILDING certification items:

1. A copy of the Construction Waste Management Plan.

2. Calculations and supporting documentation to demonstrate end-of–project recycling rates which meet the requirements of the Construction Waste Management Plan of this Section.

B. Monthly Reporting: The process for recording and assembling documentation shall be as follows:

1. Record and document the total weight (in tons) of all demolition and construction waste materials sent to the landfill. Monthly Waste Management Reporting Forms shall be used as the basis for determining the total amount of waste land filled for the project. The monthly reporting forms shall specify:

a. The number of Dumpsters or other containers sent to the landfill for that month;
b. The volume (in cubic yards) of each Dumpster or container sent to the landfill for that month;
c. The type of waste contained in each Dumpster or container, and the weight of the waste in each Dumpster or container. If the weight of the waste is not directly measured for each Dumpster or container, the following Solid Waste Conversion Factors shall be used to convert the volume of waste to weight:
   1). Solid Weight Conversion Factors:

Mixed Waste	350 lbs/cubic yard
Wood	300 lbs/cubic yard
Cardboard	100 lbs/cubic yard
Gypsum Wallboard	500 lbs/cubic yard
Rubble	1,400 lbs/cubic yard
Steel	1,000 lbs/cubic yard

d. Identification of the Landfill: Provide the name of the landfill that will be accepting the materials. Receipts or other proof of facility reception of materials is required.

2. Record and document the total weight (in tons) of all demolition and construction waste materials recycled or salvaged. Monthly Waste Management Reporting Forms shall be used as the basis for determining the total amount of waste recycled or salvaged for the project. The monthly reporting forms shall specify:

   a. The number of Dumpsters or other containers of recycled or salvaged materials for that month;
   b. The volume (in cubic yards) of each Dumpster or container of recycled or salvaged materials for that month;
   c. The type of recycled or salvaged material contained in each Dumpster or container; and
   d. The weight of the recycled or salvaged material in each Dumpster or container. If the weight of the material is not directly measured for each Dumpster or container, the Solid Waste Conversion Factors listed for landfill waste (see above) shall be used, where applicable, to convert the volume of material to weight. For materials not contained in the Solid Waste Conversion Factors above (e.g. glass), propose a conversion factor for review by the City of New York and Commissioner.
   e. Provide the name of the receiving facilities/companies that will be purchasing or accepting the recycled or salvaged materials. Receipts or other proof of facility reception of materials is required.
   f. For materials separated for recycling off-site, establish a method for tracking the weight of the recycled material. The method shall be included in the CWM Plan for the City of New York's and Commissioner's review and approval.

3. Calculate the end-of-project recycling rate percentage by dividing the recycled and salvaged waste (in tons) by the total waste generated (recycled, salvaged, and land filled waste – also in tons), and multiplying by 100.

4. LEED Submittal: LEED letter template for Credit MR 2.1 and 2.2, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.

5. Qualification Data: For Waste Management Coordinator and refrigerant recovery technician.

6. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1 IMPLEMENTATION

A. The Contractor shall be responsible for coordination and implementation of the overall Construction Waste Management Plan, as well as coordination of the Plan with all affected trades.

B. The Contractor shall designate one individual as the on-site Construction Waste Management Representative, who will be responsible for communicating the progress of the Plan with the City of New York and Commissioner on a regular basis, and for assembling the required LEED documentation.

C. The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.

D. Separation Facilities: If waste sorting will be done on site, the Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.

3.2 MEETINGS

A. Conduct Construction Waste Management meetings. Meetings shall include Subcontractors affected by the CWM Plan. At a minimum, waste management goals and issues shall be discussed at the following meetings:

1. Pre-bid meeting.

2. Pre-construction meeting.

3. Regular job-site meetings.

B. Monthly Waste Management Reporting Forms: Monthly Waste Management Reporting Forms, as required in the Submittal Requirements of this Section, shall be

submitted to the City of New York and Commissioner for review throughout the duration of the project.

END OF SECTION

SECTION 018113

LEED REQUIREMENTS

1.1 SUMMARY

A. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

B. LEED Prerequisites:

1. Prerequisite SS 1, Construction Activity Pollution Prevention.
2. Prerequisite EA 1, Fundamental Building Systems Commissioning.
3. Prerequisite EA 2, Minimum Energy Performance.
4. Prerequisite EA 3, Fundamental Refrigerant Management.
5. Prerequisite MR 1, Storage and Collection of Recyclables.
6. Prerequisite IEQ 1, Minimum IAQ Performance.
7. Prerequisite IEQ 2, Environmental Tobacco Smoke (ETS) Control.
8. Prerequisite WE 1, Water Use Reduction.

C. Applicable LEED Credits:

1. Credit SS 1, Site Selection.
2. Credit SS 2, Development Density and Community Connectivity
3. Credit SS 4.1, Alternative Transportation - Public Transportation Access
4. Credit SS 4.2, Alternative Transportation - Bicycle Storage and Changing Rooms.
5. Credit SS 4.3, Alternative Transportation – Low Emitting and Fuel Efficient Vehicles.
6. Credit SS 4.4, Alternative Transportation - Parking Capacity.
7. Credit SS 6.1, Stormwater Design - Quantity Control.

8. Credit SS 6.2, Stormwater Design - Quality Control.
9. Credit SS 7.1, Heat Island Effect - Non-Roof.
10. Credit SS 7.2, Heat Island Effect - Roof.
11. Credit SS 8, Light Pollution Reduction.
12. Credit WE 1.1, Water Efficient Landscaping - Reduce by 50%.
13. Credit WE 1.2, Water Efficient Landscaping - No Potable Use or No Irrigation.
14. Credit WE 3.1, Water Use Reduction - 20% Reduction
15. Credit WE 3.2, Water Use Reduction - 30% Reduction
16. Credit EA 1, Optimize Energy Performance: Improve by 24% for New Buildings.
17. Credit EA 3, Enhanced Commissioning.
18. Credit EA 4, Enhanced Refrigeration Management.
19. Credit EA 6, Green Power.
20. Credit MR 2.2, Construction Waste Management - Divert 75% from Disposal.
21. Credit MR 4.1, Recycled Content: 10% post-consumer plus 1/2 pre-consumer.
22. Credit MR 4.2, Recycled Content: 20% post-consumer plus 1/2 pre-consumer.
23. Credit IEQ 1, Outdoor Air Delivery Monitoring.
24. Credit IEQ 2, Increased Ventilation
25. Credit IEQ 3.1, Construction IAQ Management Plan - During Construction.
26. Credit IEQ 3.2, Construction IAQ Management Plan - After Construction.
27. Credit IEQ 4.1, Low-Emitting Materials - Adhesives & Sealants.
28. Credit IEQ 4.2, Low-Emitting Materials - Paints and Coatings.
29. Credit IEQ 4.3, Low-Emitting Materials – Carpet Systems.
30. Credit IEQ 4.4, Low-Emitting Materials – Composite Wood and Agrifiber Products.
31. Credit IEQ 6.1, Controllability of Systems - Lighting
32. Credit IEQ 7.1, Thermal Comfort - Design.
33. Credit IEQ 7.2. Thermal Comfort – Verification.
34. Credit ID 2, LEED Accredited Professional.

D. Site Preparation: Erosion and Sedimentation Control: Comply with best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-832-R-005, Construction IAQ Management: Follow the recommended Control Measures of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction. Protect stored on-site or installed absorptive materials from moisture damage. Use appropriate filtration media.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION

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SECTION 018116

ENVIRONMENTAL PRACTICES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

C. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

D. The City of New York requires the Contractor to efficiently use resources and energy to the fullest extent possible in the completion of the Project. Resource-efficient aspects to be considered in completing this Project include use of techniques that minimize waste generation, reuse of materials on site where possible, and recycling of waste generated during the construction process.

1.2 SUMMARY

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the environmental practices as specified herein, including, but not limited to, the following:

1. To create an energy-efficient and environmentally-sensitive structure.

2. To create a Work which is responsive to the needs for air, water, land ecosystems quality.

   a. Protect the environment, both on site and off site, during demolition and construction operations.
   b. Minimize environmental pollution and damage.
   c. Effect optimum control of solid wastes.

3. To create a work which utilizes fossil fuel and renewable energy sources with care and efficiency.

4. To create a work which utilizes sustainable and renewable resources with craft and efficiency.

5. To create a work which provided to the greatest extent feasible interior environment that promotes occupant health and productivity.

B. Specific requirements for the work may be specified in the individual trade sections.

C. Alternates: Alternate products and methods which further the environmental goals of the project shall be submitted by the Contractor for consideration by the Commissioner.

1.3 REFERENCES

A. Rule 1168 – "Adhesive and Sealant Applications," amended 01/07/05: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov

B. Regulation 8 (Organic Compounds), Rule 51 (Adhesive and Sealant Products), amended 5/2/01: Bay Area Air Quality Management District (BAAQMD), State of California, www.baaqmd.gov

C. American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE):

1. ASHRAE/IES 90.1-2004: Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings.

2. ASHRAE 62.1 - 2004: Ventilation for acceptable Indoor Air Quality.

3. ASHRAE Guideline 1-1996: Guideline for Commissioning HVAC Systems.

D. American Society for Testing and Materials (ASTM)

1. ASTM D 5116: Guide for Small Scale Environmental Chamber Determination of Organic Emissions from Indoor Materials/Products.

E. Green Seal

1. GS5: Environmental Standard for Compact Fluorescent Lamps.

2. GS6: Environmental Standard for Water Efficient Fixtures.

F. Environmental Protection Agency (EPA)

1. Energy Star.

2. Green Lights.

3. Waste Wise.

G. NFPA 101 relative to non-toxic off gassing during construction.

1.4 DEFINITIONS

A. Adequate Ventilation: Ventilation, including air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of dust fumes, vapors, or gases.

B. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.

1. Rubbish: Includes both combustible and non-combustible wastes, such as paper, boxes, glass, crockery, metal and lumber scrap, metal cans, and other organic material.

2. Debris: Includes both combustible and non-combustible waste that result from construction or maintenance and repair work.

C. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.

D. Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.

E. Hazardous Materials: Include pesticides, biocides, and carcinogens as listed by recognized authorities, such as the Environmental Protection Agency (EPA) and the International Agency for Research on Cancer (ARC).

F. Interior Finishes: Materials and products that will be exposed at interior, occupied spaces; including flooring, wall covering, finish carpentry, and ceilings.

G. Municipal Solid Waste Landfill: A permitted facility that accepts solid, non-hazardous waste such as household, commercial and industrial waste, including construction and demolition waste.

H. Packaged Dry Products: Materials and products that are installed in dry form and are delivered to the site in manufacturer's packaging; include carpets, resilient flooring, ceiling tiles, and insulation.

I. Sediment: Soil and other debris that has been eroded and transported by storm or well production runoff water.

J. Sanitary Wastes

1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food.

2. Sewage: Domestic sanitary sewage.

K. Wet Products: Materials and products installed in wet form, including paints, sealants, adhesives, and special coatings.

L. The LEED (Leadership in Energy and Environmental Design) Building Rating System is a system designed to evaluate environmental performance from a whole building perspective over a buildings life cycle, providing a definitive standard for what constitutes a "green building." The Contractor shall comply with the requirements of these specifications and LEED Rating System Version 2.2 to achieve a Certified LEED Building.

1.5 SUBMITTALS

A. Submit certification evidencing compliance with Environmental Performance Criteria:

1. Low flow water fixtures.

2. Green Light Program.

3. Energy Star Program.

B. LEED Building Submittal Requirements

1. See Section 013329, LEED Submittals

1.6 SYSTEM DESCRIPTION

A. Resource Management Requirements

1. Recycled Content: Provide products manufactured from recycled contents to the greatest extent possible. (See trade sections for specific contents.)

2. Reusability/Recyclability: To the greatest extend possible, provided products for which secondary markets, take back, or leasing programs exist.

B. Toxicity/Hazardous Materials Requirements

1. Toxic/Hazardous Contents: Products containing carcinogens listed by any of the following will not be permitted without notification.

a. EPA-CAG list of carcinogens.
b. Clean Air Act - Sections 109, 111, and 112. The National Toxicology Program's latest published Annual Report on Carcinogens.
c. IARC-Human Carcinogens (Groups 1, 2A, and 2B).
d. Products that require toxic or hazardous materials for maintenance will not be permitted.

2. Outgassing/Reactivity

a. Formaldehyde: Wood products containing added urea-formaldehyde will not be permitted.
b. Chlorofluorocarbons (CFC): Products and equipment requiring or using CFC during the manufacturing process will not be permitted. Products and equipment requiring or using CFC during normal operation will not be permitted.
c. Volatile Organic Compounds (VOC)

1). Paints, Coatings, Sealers: Comply with South Coast Air Quality Management District (SCAQMD) rules and regulations.

2). Refer to Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings," and Section 099000 for painting.

3. VOC Requirements For Adhesives

1). Refer to Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings," and Section 099000 for painting.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

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SECTION 018119

CONSTRUCTION IAQ MANAGEMENT

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 CONSTRUCTION IAQ MANAGEMENT GOALS FOR THE PROJECT

A. The City of New York has established that this Project shall minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities. Factors that contaminate indoor air, such as dust entering HVAC systems and ductwork, improper storage of materials on site, and poor housekeeping, shall be minimized.

1.3 SUMMARY

A. This Section includes requirements for the development of a Construction Indoor Air Quality Management Plan.

1. Management Plan (referred to as "the Plan"): Develop the Plan for approval by the City of New York and Commissioner. The Plan shall be implemented throughout the duration of the project construction, and shall be documented as outlined in the Submittal Requirements of this Section. The Plan is included as part of the LEED Building requirements for the project.

1.4 RELATED SECTIONS

A. All sections of the Specifications related to interior construction, MEP systems, and items affecting indoor air quality.

B. LEED Submittals - Section 013329.

C. Construction Waste Management - Section 017419.

D. LEED Requirements - Section 018113.

E. Environmental Practices - Section 018116.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Volatile Organic Compound (VOC) Limits For Adhesives, Sealants & Architectural Coatings - Section 018419.

H. Painting - Section 099000.

1.5 DEFINITIONS

A. Volatile Organic Compounds (VOCs): Chemical compounds common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives; composite wood binder, and foam insulations. Not all VOCs are harmful, but many of those contained within building products contribute to the formation of smog and can irritate (or worse) building occupants by their smell and/or health impact.

B. Materials that Act as "Sinks" for VOC Contamination: Absorptive materials, typically dry and soft (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOCs emitted by "source" materials and release them over a prolonged period of time.

C. Materials that Act as "Sources" for VOC Contamination: Products with high VOC contents that emit VOCs either rapidly during application and curing (typically "wet" products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically "dry" products such flooring coverings with plasticizers and engineered wood with formaldehyde).

1.6 REFERENCES

A. "IAQ Guidelines for Occupied Buildings Under Construction," First Edition, November 1995, Chapter 3; The Sheet Metal and Air Conditioner Contractors National Association (SMACNA), (703) 803-2980, www.smacna.org

B. ANSI/ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size," www.ashrae.org

1.7 CONSTRUCTION IAQ MANAGEMENT PLAN

A. The Contractor shall prepare and submit a Construction IAQ Management Plan to the City of New York for approval. The Construction IAQ Management Plan shall meet the following criteria:

1. Construction activities shall be planned to meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) "IAQ Guidelines for Occupied Buildings under Construction," First Edition, 1995, Chapter 3.

2. Absorptive materials shall be protected from moisture damage when stored on site and after installation.

3. If air handlers are to be used during construction, filtration with a Minimum Efficiency Reporting Value (MERV) of 8 must be at each return air grill, as determined by ASHRAE 52.2-1999.

4. All filtration media shall be replaced immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999.

5. A "Sequence of Finish Installation Plan" shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as "sinks."

B. Upon approval of the Plan by the City of New York and Commissioner, it shall be implemented through the duration of the construction process, and documented in accordance with the Submittal Requirements of this Section.

C. Further description of the Construction IAQ Management Plan requirements is as follows:

1. SMACNA Guidelines: Chapter 3 of the referenced "IAQ Guidelines for Occupied Buildings Under Construction," outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format, and shall address measures to be implemented in each of the five categories (including subsections). All subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such.

   a. HVAC Protection
      - Return Side
      - Central Filtration
      - Supply Side
      - Duct Cleaning
   b. Source Control
      - Product Substitution
      - Modifying Equipment Operation
      - Changing Work Practices
      - Local Exhaust
      - Air Cleaning
      - Cover or Seal
   c. Pathway Interruption
      - Depressurize Work Area
      - Pressurize Occupied Space
      - Erect Barriers to Contain Construction Areas
      - Relocate Pollutant Sources
      - Temporarily Seal the Building
   d. Housekeeping
   e. Scheduling
      - Protect of Materials from Moisture Damage: As part of the "Housekeeping" section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from

moisture damage shall be described. This section should also describe measures to be taken if moisture damage does occur to absorptive materials during the course of construction.

- Replacement of Filtration Media: Under the "HVAC Protection" section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.
- Sequence of Finish Installation for Materials: Where feasible, absorptive materials shall be installed after the installation of materials or finishes which have high short-term emissions of VOCs, formaldehyde, particulates, or other air-borne compounds.
  Absorptive materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the airstream); upholstered furnishings; and other woven, fibrous or porous materials. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.
  Develop a separate sequencing plan that identifies feasible opportunities to meet the above-stated goals for the project. The plan shall be submitted to the Commissioner and City of New York in accordance with the Submittal Requirements of this Section.

1.8 LEED BUILDING SUBMITTALS

A. The Contractor shall submit the following LEED required records and documents:

1. A copy of the Construction IAQ Management Plan and the Sequence Installation Plan, as defined in this Section.

2. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets shall be submitted with the Contactor's or Subcontractor's 'approved' stamp as confirmation that the products are the products installed on the project.

3. Provide the Commissioner or City of New York's Representative with a minimum of 18 photographs, comprised of at least six photographs taken on three different occasions during construction. The photographs shall document the implementation of the Construction IAQ Management Plan throughout the course of the project construction. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs shall include integral date stamping, and shall be submitted with brief descriptions of the Construction IAQ Management Plan measure documented, or be referenced to project meeting

minutes or similar project documents which reference to the Construction IAQ Management Plan measure documented.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 IMPLEMENTATION AND COORDINATION

A. Implement the Construction IAQ Management Plan, and coordinate the Plan with all affected trades. Designate one individual as the Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the City of New York and Commissioner on a regular basis, and for assembling the required LEED Building documentation. The Contractor shall include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

B. Subcontractors shall be responsible for the implementation of specific control measures, as specified in the Construction IAQ Management Plan. Subcontractors shall coordinate their responsibilities through the Construction Manager and their designated Construction IAQ Representative.

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SECTION 018419

VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND ARCHITECTURAL COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes requirements for reduced-emission, reduced-toxicity construction adhesives, sealants, paints, and architectural coatings.

B. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 REFERENCE STANDARDS / QUALITY ASSURANCE

A. Adhesives (VOC Content): South Coast Air Quality Management District Rule #1168 – "Adhesive and Sealant Applications," amended 1/7/05: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov

B. Sealants (VOC Content): Regulation 8 (Organic Compounds), Rule 51 (Adhesive and Sealant Products), amended 5/2/01: Bay Area Air Quality Management District (BAAQMD), State of California, www.baaqmd.gov

C. Paints (VOC Content and Prohibited Compounds): "Green Seal Standard for Architectural Coating" (GS-11), plus "Green Seal Standard for Anti-Corrosive Paints" (GC-03).

1.3 RELATED DOCUMENTS

A. Construction Facilities and Temporary Controls – General Conditions.

B. LEED Submittals - Section 013329.

C. Construction Waste Management - Section 017419.

D. LEED Requirements - Section 018113.

E. Environmental Practices - Section 018116.

F. Construction IAQ Management - Section 018119.

G. In all sections of the Specifications with interior adhesive or sealant applications, "LEED Building Submittal Requirements" in Section 013329 shall be followed.

H. Painting and Finishing - Section 099000.

1.4 DELIVERY AND STORAGE

A. To the extent feasible, do not store adhesives, sealants, paints, and other Architectural coatings with materials that have a high capacity to adsorb VOC emissions (i.e., materials which are woven, fibrous or porous in nature, such as acoustical ceilings, textiles, etc.). Do not store adhesives, sealants, paints, and other Architectural coatings in occupied spaces.

PART 2 PRODUCTS

2.1 MATERIALS

A. GREEN BUILDING Performance Criteria:

1. VOC Content of Adhesives:

a. The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168, "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD) of the State of California. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds Unless otherwise specified below, the VOC content of all adhesives, adhesive bonding primers, or adhesive primers shall not be in excess of 250 grams per liter.

b. Architectural Applications:

1).	Indoor carpet adhesive	50
2).	Carpet pad adhesive	50
3).	Wood flooring adhesive	100
4).	Rubber floor adhesive	60
5).	Subfloor adhesive	50
6).	Ceramic tile adhesive	65
7).	VCT and asphalt tile adhesive	50
8).	Drywall and panel adhesive	50
9).	Cove base adhesive	50
10).	Multipurpose construction adhesive	70
11).	Structural glazing adhesives	100
12).	Single Ply Roofing Membrane Adhesive	250

c. Specialty Applications:

1).	PVC welding	510
2).	CPVC welding	490
3).	ABS welding	400
4).	Plastic cement welding	250
5).	Adhesive primer for plastic	550
6).	Contact Adhesive	80
7).	Special Purpose Contact adhesive	250

8).	Structural Wood Member adhesive	140
9).	Sheet Applied Rubber Lining Operations	850
10).	Adhesive Primer for Traffic Marking Tape	150

d. Substrate Specific Applications

1).	Metal to metal	30
2).	Plastic foams	50
3).	Porous material (except wood)	50
4).	Wood	30
5).	Fiberglass	80

e. If an adhesive is used to bond dissimilar substrates together, the adhesive with the highest VOC content shall be allowed.

2. Requirements For Interior Sealants

a. The volatile organic compound (VOC) content of sealants or sealant primers used in this project shall not exceed the limits defined in Regulation 8 (Organic Compounds), Rule 51 (Adhesive and Sealant Products) of the Bay Area Air Quality Management District (BAAQMD), of the State of California.

b. The VOC limits defined by BAAQMD are as follows. All VOC limits are defined in grams per liter, less exempt compounds.

1). Sealants:

(a).	Architectural	250
(b).	Marine Deck	760
(c).	Roadways	250
(d).	Single Ply Roof Material Installation/Repair	450
(e).	Non-membrane Roof Installation/Repair	300
(f).	Other	420

2). Sealant Primer:

(a).	Architectural – Nonporous	250
(b).	Architectural – Porous	775
(c).	Other	750

3. VOC Content of Aerosol Adhesives:

a. The volatile organic compound (VOC) content of aerosol adhesives shall not exceed the limits defined in "Green Seal Standard for Commercial Adhesives" (GS-36), 10/19/00. All VOC limits are defined in grams per liter, less water and less exempt compounds (determined by U. S. EPA Reference Test Method 24).

b. Aerosol Adhesives:

1).	General Purpose Mist Spray	65% VOCs by weight
2).	General Purpose Web Spray	55% VOCs by weight
3).	Special Purpose Aerosol Adhesives, all types	70% VOCs by weight

4. VOC Content of Paints:

   a. The Volatile Organic Compound (VOC) content of paints shall not exceed the limits defined in the "Green Seal Standard for Architectural Coating" (GS-11) as of 5/20/93. The VOC limits are as follows. All VOC limits are defined in grams per liter, less water.

   b. Paint:

1).	Non-flat interior coatings	150
2).	Flat interior coatings	50

5. VOC Content of Anti-Corrosive Paints:

   a. The Volatile Organic Compound (VOC) content of paints shall not exceed the limits defined in the "Green Seal Standard for Anti-Corrosive Paints" (GC-03), Second Edition, 1/7/97. All VOC limits are defined in grams per liter, less water.

   b. Anti-Corrosive Paints:

1).	Anti-Corrosive Paints	250

6. VOC Content of Clear Wood Finishes, Floor Coatings, Stains, Sealers, Shellacs:

   a. The Volatile Organic Compound (VOC) content of paints shall not exceed the limits defined in the South Coast Air Quality Management District Rule #1113, "Architectural Coatings," 1/1/04.

   b. Clear Wood Finishes:

1).	Varnish	350
2).	Lacquer	550

   c. Floor Coatings: 100

   d. Sealers:

1).	Waterproofing Sealers	250
2).	Sanding Sealers	275
3).	Other Sealers	200

PART 3 EXECUTION

3.1 INSTALLATION

A. Coordinate installation of all adhesives, sealants, paints, and coatings with the ventilation and sequencing criteria defined in Specification Section 018119, "Construction IAQ Management."

B. When installed over concrete slabs, verify compatibility of adhesives with curing compounds, leveling agents, or sealing agents used for slab preparation.

END OF SECTION

SECTION 019113

GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes general administrative and procedural requirements for the commissioning process to supplement other Division 01 commissioning process activity Sections and other Sections in Divisions 22, 23, and 26 that specify testing of components, systems and assemblies.

B. Related Sections include the following:

1. Division 21 Section "Commissioning of Fire Suppression" for commissioning process activities for fire-suppression systems, assemblies, equipment, and components.
2. Division 22 Section "Commissioning of Plumbing" for commissioning process activities for plumbing systems, assemblies, equipment, and components.
3. Division 23 Section "Commissioning of HVAC" for commissioning process activities for HVAC&R systems, assemblies, equipment, and components.
4. Division 26 Section "Commissioning of Electrical Systems" for commissioning process activities for electrical systems, assemblies, equipment, and components.
5. Division 28 Section "Commissioning of Electronic Safety and Security" for commissioning process activities for electronic safety and security systems, assemblies, equipment, and components.

1.3 DESCRIPTION

A. Commissioning is a systematic process of confirming that all building systems perform interactively according to the Owner's Program Requirements and the Basis of Design and continuing through construction, acceptance and the warranty period with actual verification of performance.

B. Commissioning during **design** is intended to achieve the following specific objectives:

1. Verify the Owner's Program Requirements and Basis of Design are clearly documented and they meet the City of New York's goals and objectives.
2. Provide Design Review during AE design efforts.
3. Verify commissioning for the construction phase is adequately reflected in the bid documents.

C. Commissioning during the **construction** phase of this project is intended to achieve the following specific objectives:

1. Provide direction for the commissioning process during construction, particularly providing resolution to issues and providing details not developed during design (ex. scheduling, participation of various parties, lines of reporting and approvals, coordination, etc.)
2. Verify that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
3. Verify and document proper performance of equipment and systems.
4. Verify that O&M documentation left on site is complete.
5. Verify that the City of New York's operating personnel are adequately trained.

D. The Commissioning process does not take away from or reduce the responsibility of the system designers to design a workable system nor the installing contractors to provide a finished and fully functioning product.

E. The CxA directs and coordinates the commissioning activities and reports to the Commissioner. All members in the construction process work together to fulfill their contracted responsibilities and meet the objectives of the Owner's Project Requirement's as detailed in the Contract Documents.

F. The CxA works with the CM/GC according to established protocols to schedule the commissioning activities. The CxA will provide sufficient notice to the CM/GC and Commissioner for scheduling commissioning activities. Meanwhile, the CxA will integrate these activities into the master construction schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

G. The following narrative provides a brief overview of the commissioning tasks during construction and the general order in which they occur.

1. Commissioning during construction begins with a Commissioning Kick-Off Meeting – Construction Team conducted by the CxA where the commissioning process is reviewed with the commissioning team members.
2. Additional meetings will be required throughout construction, scheduled by the CxA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems.
3. Equipment documentation is submitted to the CxA through the submittal process, including detailed start-up procedures.
4. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with Prefunctional checklists being completed before functional testing begins.
5. The contractors, under their own direction, document and perform startup and initial checkout. The CxA documents that startup was completed according to the approved plans, when contracted. This may include the CxA witnessing start-up of selected equipment, if contracted.
6. The CxA verifies installation integrity thru the use of checklists.
7. The CxA develops specific equipment and system functional performance test procedures. The contractors review the procedures.
8. The procedures are executed by the contractors, under the direction of, and documented by the CxA.

9. Items of non-compliance in material, installation or setup are corrected at the contractor's expense and the system retested.
10. The CxA reviews the O&M documentation for completeness.
11. Commissioning is completed before Substantial Completion, whenever possible.
12. The CxA reviews and pre-approves the training plan provided by the contractors.
13. The contractors coordinate and provide training via qualified instructors.
14. Training occurs.
15. The Commissioner verifies that training has occurred and provides a written statement that training has occurred.
16. Deferred testing is conducted, as specified or required.

1.4 DEFINITIONS

A. Acceptance: A formal action, to declare that some aspect of the project meets defined requirements, thus permitting subsequent activities to proceed.

B. Acceptance Phase: Phase of commissioning after start-up and initial checkout when functional performance tests, O&M documentation review and training occurs.

C. Architect/Engineer (AE): the prime Consultant (Architect) and Subconsultants who comprise the design team, generally the HVAC Mechanical Designer/Engineer, the Electrical Designer/Engineer and various other Subconsultants.

D. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the contract documents.

E. Basis of Design (BOD): A document that records concepts, calculations, decisions and product selections used to meet the Owner's Project Requirements and to satisfy applicable regulatory requirements, standards and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process. Also known as the Design Criteria.

F. Checklists: Verification checklists that are developed and used during all phases of the commissioning process to verify that the Owner's Project Requirements are being achieved. This includes checklists for general verification, plus testing, training, and other specific requirements.

G. Commissioning Authority (CxA): An entity identified by the Commissioner who plans, schedules and coordinates the commissioning team to implement the Commissioning Process. The City of New York has engaged **Horizon Engineering Associates, LLP** as the CxA under a separate contract.

H. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

I. Commissioning Process: A quality-focused process for enhancing the delivery of a project and includes verifying and documenting that the facility and its systems and assemblies are planned, designed, installed, tested, operated and maintained to meet the Owner's Project Requirements.

J. Commissioning Process Progress Report: A written document that details activities completed as part of the commissioning process and significant findings from those activities that is continuously updated during the course of a project.

K. Commissioning Report: A document recording the results of the commissioning process, including the record documents, performance of the commissioned systems and documents all sign-offs.

L. Commissioning Specifications: The contract document that details the objective, scope and implementation of the construction and acceptance phases of the commissioning process as developed in the Commissioning Plan.

M. Commissioning Team: A team comprised of the CxA, Commissioner, AE, Construction Manager/General Contractor, Contractors, maintenance and operations personnel, and occupants. Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action.

N. Contract Documents: The documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, Cx Plan, etc.)

O. Contractor: the CM or subcontractors authorized representatives.

P. Construction Manager (CM): the prime contractor for this project. Generally refers to all the CM's subcontractors as well. Also referred to as the Contractor, in some contexts.

Q. Data Logging: The monitoring and recording of flow, current, status, pressure, etc. of equipment using 'stand-alone' data recorders separate from the control system or the trending capacities of control systems.

R. Deferred Performance Tests (DPTs): Performance tests that are performed, at the discretion of the CxA, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow the test from being performed.

S. Deficiency: A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the Owner's Project Requirements).

T. Equipment Manufacturer: The multiple companies that will manufacturer equipment and products for the commissioned systems and who will participate as required in the commissioning activities.

U. Factory Testing: Testing of equipment on-site or at the factory, by factory personnel, with or without City of New York's representative present.

V. Functional Performance Test: The testing of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods.

Functional testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, etc. The systems are run through all the control system's sequence of operation and components are verified to be responding as the sequences state. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor.

W. General Contractor: The prime contractor for this project. Generally refers to all the GC's subcontractors as well. Also referred to as the Contractor, in some contexts.

X. HVAC&R: Heating, Ventilating, Air Conditioning, and Refrigeration.

Y. Issues Log: A formal and ongoing record of problems or concerns – and their resolution – that have been raised by members of the commissioning team during the course of the commissioning process.

Z. Manual Test: Using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the 'observation').

AA. Monitoring: The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.

BB. Non-Compliance: See Deficiency.

CC. Non-Conformance: See Deficiency.

DD. Owner's Project Requirements (OPR): A written document that details functional requirements of the Project and the expectations of how the Project will be used and operated. This includes project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information. (Also formerly known as the Design Intent Document.)

EE. Owner's Representative or Commissioner: The contracting and managing authority for the City of New York who oversees the design and/or construction of the project.

FF. Over-written Value: Writing over a sensor value in the control system to see the response of a system.

GG. Phased Commissioning: Commissioning that is completed in phases (by floors, for example) due to the size of a project or other scheduling issues, in order to minimize the total construction time.

HH. Re-Commissioning Management Manual: A single manual that contains information required for recommissioning the projects' building systems.

II. Sampling: Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.

JJ. Seasonal Performance Test: Performance tests that are deferred until the system(s) will experience conditions closer to their design conditions based on weather conditions.

KK. Simulated Condition: Condition that is created for the purpose of testing the response of a system (eg. Raising/lowering the set-point of a thermostat to see the response in a VAV box).

LL. Simulated Signal: Disconnecting a sensor and using a signal generator to simulate a sensor value for the purpose of testing a full range of conditions.

MM. Startup: The initial starting or activating of dynamic equipment, including completing construction checklists.

NN. Systems Manual: A systems focused composite document that includes the operation manual, maintenance manual, and additional information of use to the City of New York during the occupancy and operations phase.

OO. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

PP. Test Procedures: The step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CxA.

QQ. Test Requirements: Requirements specifying what modes and functions, etc. shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents.

RR. Training Plan: A written document that details the expectations, schedule, budget and deliverables of commissioning process activities related to training of project operating and maintenance personnel, users, and occupants.

SS. Trending: Monitoring over a period of time.

TT. Verification: The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the Owner's Project Requirements.

UU. Warranty Period: Warranty period for the entire project, including equipment components. Warranty begins at Substantial Completion and extends typically for at least one year, unless specifically noted otherwise in the Contract Documents.

1.5 SUBMITTALS

A. The CxA will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The CxA will notify the Contractor, Commissioner or AE as requested,

of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

B. The CxA will review the submittals once. The CxA will receive a copy of the final approved submittals.

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxAupon request.

1.7 COORDINATION

A. Commissioning Kick-Off Meeting – Construction Team: Contractors will attend a meeting of the Commissioning Team, chaired by the CxA, to review the scope of commissioning process activities and the Commissioning Plan with discussions on milestones, activities, and assignments of responsibilities. The flow and type of documents and the amount of submittal data given to the CxA will be determined. Meeting minutes will then be distributed to all parties by the CxA.

B. Commissioning Meetings: Contractors will attend coordination meetings with the Commissioning Team, chaired by the CxA, to review progress on the Commissioning Plan, construction deficiencies, scheduling conflicts, and to discuss strategies and processes for upcoming commissioning process activities.

C. Miscellaneous Construction Meetings: The CxA attends selected planning and job-site meetings in order to remain informed on construction progress and to update parties involved in the commissioning process.

D. Pre-testing Meetings: Contractors will attend pretest meetings with the Commissioning Team, chaired by the CxA, to review startup reports, pre-test inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.

E. Testing: Contractors will coordinate with testing personnel and agencies for timing and access for CxA to witness test.

F. Manufacturers' Inspection and Startup Services: Contractors will coordinate services of manufacturers' inspection and startup services.

G. Testing, Adjusting and Balancing: Contractors will coordinate with plan and schedule for testing, adjusting and balancing for timing and access for CxA to witness process.

PART 2 – PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the mechanical contractor of Division 23 shall ultimately be responsible for all standard testing equipment for the HVAC system and controls system in Division 23, except for equipment specific to and used by TAB in their commissioning responsibilities. A sufficient quantity of two-way radios shall be provided by each subcontractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from the vendor) required for testing shall be included in the base bid price to the Commissioner and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.

D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the City of New York.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 – EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. Submittals: See Section 1.5 – SUBMITTALS for requirements.

B. Checklists

1. The CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems.

C. **Red-lined Drawings**: The Contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be available to the Commissioning Team for use prior to start of the Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The contracted party, as defined in the Contract Documents will create the as-built drawings.

D. **Operation and Maintenance Data:** Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.

E. **Demonstration and Training:** Contractor will provide demonstration and training as required by the specifications. A complete training plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any training. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session.

3.2 COMMISSIONER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and Contractors for use in developing the Commissioning Plan; testing plans and checklists.

B. Provide the Basis of Design documents, prepared by the architect and approved by the Commissioner, for use in developing the Commissioning Plan; testing plans and checklists.

C. Assign operation and maintenance personnel and schedule them to participate in Commissioning Team activities including, but not limited to, the following:

1. Commissioning meetings.
2. Construction phase coordination meetings.
3. Piping and ductwork testing and flushing verification meetings.
4. Procedures meeting for testing, adjusting and balancing.
5. Testing and demonstration of systems, subsystems and equipment.
6. Training in operation and maintenance of systems, subsystems and equipment.
7. Final review and acceptance meetings

D. Provide utility services required for the commissioning process.
E. Facilitate the coordination of the commissioning work between the CxA, the Contractor and the Architect and Engineers to ensure that the commissioning activities are incorporated into the master schedule.
F. Review and approve the commissioning plan.
G. Coordinate any seasonal or deferred testing.
H. Ensure that any seasonal, deferred testing and/or deficiency issues are addressed.

3.3 DESIGN PROFESSIONAL'S RESPONSIBILITIES

A. Attend the Commissioning Kick-Off Meeting – Design Team, Commissioning Kick-Off Meeting – Construction Team and selected team meetings.
B. Perform submittal review, construction observation, as-built drawing preparation, other items as contracted.

C. Provide the Basis of Design Document. The designers shall assist (along with the contractors) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
D. Participate in the resolution of system deficiencies identified during the commissioning, according to the contract documents.
E. Construction Record documents and specifications.
F. Insure that the CxA's submittals comments are incorporated into the Design Professional's submittal comments prior to sending to CM or GC for distribution.
G. Facility operating procedures for normal, abnormal, and emergency modes of operation.
H. Participate in resolution of design non-conformance and design deficiencies identified during the warranty-period commissioning process.
I. Provide a written description and rational for all energy and water saving features and strategies with operating instructions and caveats about their function and maintenance relative to energy use.
J. Provide written guidelines for establishing and tracking benchmarks for whole building energy use and equipment efficiencies of cooling, heating and service hot water equipment.
K. Provide a written list of diagnostic tools, with use descriptions, to assist facility staff.

3.4 CONTRACTOR'S RESPONSIBILITIES

A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following brief overview:

1. Facilitate the coordination of commissioning and incorporate commissioning activities into the overall project.

2. Provide copies of all applicable submittals as required in Division 01 including all changes thereto.

3. Provide detailed startup procedures.
4. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, perform corrective actions.
5. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
6. Attend commissioning team meetings held on a scheduled basis.
7. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CxA. Furnish a copy of the O&M literature to the CxA forty five (45) days after final equipment submittals.
8. In each purchase order or subcontract written, include requirements for submittal data, O&M literature, commissioning tasks and training.
9. Integrate and coordinate commissioning process activities with construction schedule.
10. Review and accept construction checklists provided by the CxA.
11. Review and accept commissioning process test procedures provided by the CxA.
12. Complete commissioning process test procedures.

13. Submit training plan for approval, coordinate training and provide qualified instructors for training of City of New York personnel.
14. Assist the CxA as necessary in the seasonal testing, deferred testing an deficiency resolution.
15. Ensure that subcontractors correct deficiencies and make necessary adjustments to submittals, O&M manuals and red-lined drawings for applicable issues identified in any seasonal testing.
16. Provide written as-built controls drawings and sequences of operation for all equipment.
17. Provide a written list of time of day schedules and a schedule frequency to review them for relevance and efficiency.
18. Provide written recommendations for recalibration frequency of sensors and actuators by type and use.
19. Provide a written list of all user adjustable set-points and reset schedules with a brief discussion of the purpose of each and the range of reasonable adjustments with energy implications
20. Provide a written schedule frequency to review the various set-points and reset schedules to ensure they are current relevant and efficient values.
21. Provide a written list of diagnostic tools with use descriptions to assist facility staff.

3.5 EQUIPMENT SUPPLIERS RESPONSIBILITIES

A. Roles and Responsibilities

1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Commissioner, to keep warranties in force.
2. Assist in equipment testing per agreements with subcontractors.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

3.6 COMMISSIONING AUTHORITY RESPONSIBILITIES

A. Roles and Responsibilities

1. The CxA is <u>not</u> responsible for the design concept, the design criteria, compliance with codes, design or general construction scheduling, cost estimating or construction management.
2. The CxA may assist with problem solving and non-conformance items or deficiencies, but the CxA is not the Design Engineer / Engineer of Record, and the commissioning process does not preclude the design engineer / Engineer of Record of responsibilities for system evaluations, adequacy of systems to meet the OPR, capacities of systems, quality control checks, or any of the other elements and recommended final acceptance of systems to the Commissioner.
3. The primary role of the CxA is to coordinate and direct the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultants with all necessary parties, frequently updated timelines and schedules and technical expertise.

B. Commissioning Plan

1. The CxA shall develop a Commissioning Plan at the start of the project. The Commissioning Plan shall outline the organization, schedule, allocation of resources, and documentation requirements of the Commissioning Process.
2. The Commissioning Plan shall be a "living document" in which information is added to or modified by the Commissioning Team during the course of the Project.
3. At the end of the Project, the CxA shall provide the Commissioner with the Final Commissioning Plan for the City of New York's use.

C. Document Review

1. Review the Owner's Project Requirements and Basis of Design developed by the design professionals.
2. Perform a focused review of the drawings and specification during the Design Development and near the end of the Construction Document Phase
3. Develop full commissioning specifications for all systems and equipment to be commissioned. The commissioning specifications will be subject to approval of the design team and included in the final construction specifications.
4. Review submittals applicable to systems being commissioned for compliance for commissioning needs, concurrent with the AE's reviews.

D. Cx Team Meetings

1. Commissioning during construction will begin with a 'Commissioning Kick-Off Meeting – for Construction Team' conducted by the CxA where the commissioning process is reviewed with all of the commissioning team members.
2. Additional meetings will be required throughout construction, and will be scheduled by the CxA on a weekly basis with necessary parties of the commissioning team attending, in order to plan, scope, coordinate, and schedule future activities and resolve problems.

E. Coordination and Scheduling

1. Coordinate and direct commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications, and consultations with all necessary parties.
2. Coordinate commissioning work with the CM/GC to ensure that commissioning activities are being scheduled into the master project schedule.

F. Commissioning Progress

1. Perform site visits, as necessary, to observe component and system installations.
2. Attend selected planning and jobsite meetings to obtain information on construction progress.
3. Review construction meeting minutes for revisions/substitutions relating to the commissioning process.

G. Pipe Testing, Flushing and Cleaning

1. Review and approve the pipe testing, flushing and cleaning plan submitted by the Contractor.
2. Witness all or part of the pipe testing, flushing and cleaning and be sufficiently confident that proper procedures are being followed.
3. Document via the online Commissioning Issues Log any deficiencies in the procedures or results.

H. Pre-Functional Checks

1. Verify proper installation of components, equipment, systems and assemblies. Sampling procedures may NOT be employed on systems and equipment.

I. Equipment and System Startup and Verification

1. Review and approve component, equipment, system and assembly startup plan developed and submitted by the Contractor.
2. Approve system startup by reviewing startup reports, if contracted; and by selected site observation.
3. Review the Testing, Adjusting and Balancing execution plan for the project, which shall be submitted by the TAB subcontractor.
4. Verify and document the accuracy of the air and water systems balancing by spot testing the air and water reported field values with TAB subcontractors and by reviewing completed reports.

J. Functional Performance Testing

1. With assistance from the Contractor, write Functional Performance Testing procedures for all components, equipment or systems to be commissioned.
2. With the assistance of the Contractors, coordinate Functional Performance Testing. Witness and approve Functional Performance Testing performed by the Contractors.
3. With the assistance of the Contractors, coordinate retesting as necessary until satisfactory performance is achieved.
4. Witness seasonal or deferred Functional Performance Testing as necessary.

K. Issue/Deficiency Logs

1. The CxA shall prepare a formal, ongoing, online record of deficiencies, problems and concerns – and their resolution – raised by members of the Commissioning Team during the Commissioning Process.
2. Issues will be recorded on an online Commissioning Issues Log for the AE, CM/GC and Contractors to resolve to the satisfaction of the Commissioner. Issues will be added by the CxA. Team members are required to post their own responses to issues pertaining to their work. Team members are required to respond to issues added to the list within five (5) working days of being added by the CxA.
3. Issues will be revisited one (1) time to verify that the proper corrections have been made. The Commissioner reserves the right to deduct from the Contractors' contract costs associated with additional revisits required for outstanding issues.

4. When issues are resolved, they will be closed on the Issues Log by the CxA.

L. Operation and Maintenance Data

1. The CxA shall review of the documentation submitted by the Contractor as required by the Specifications for completeness and accuracy. This commissioning review supplements, but does not replace, the Architect/Engineer's review.
2. Review equipment warranties to ensure that the Commissioner's responsibilities are clearly defined.

M. Training

1. The CM/GC and Contractors will provide all documentation and qualified training personnel for training.
2. The CxA will verify through the Contractor's plan and schedule, training agendas, and select observations that proper training procedures were followed on all commissioned systems.
3. See appropriate section below pertaining to training.

N. Systems Manual Requirements

1. Index of Systems Manual with notation as to content storage location if not in actual manual.
2. Executive Summary
3. A list of recommended operational record keeping procedures at the facility level, including sample forms, trend logs, or others, and a rationale for each.
4. Maintenance procedures, schedules and recommendations.
5. Ongoing Optimization

O. Post Occupancy Review

1. The CxA will return to the site within the 12-month warranty period to address the following: review current building operations with facility staff and address outstanding issues related to the Owner's Project Requirements; Interview facility staff and identify problems or concerns with operating the building; Identify problems covered under warranty or under the original construction contract.
2. The CxA will make suggestions for improvements in the content of the O&M Manuals. Any required changes shall be made by the contractor responsible for that section.
3. The CxA shall assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

P. Commissioning Final Report

1. The CxA shall provide a final report following the completion of all Functional Performance Testing. The report is to outline compliance and non-compliance to the construction documents, as well as identify concerns relative to future performance

3.7 GENERAL TESTING REQUIREMENTS

A. Prefunctional checklists are important to ensure that the equipment and systems are installed and operational. They ensure that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full Prefunctional checkout. The Prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system. The Commissioning Authority shall complete the Pre-Functional checks in the field, with assistance from the installing Contractors (where necessary).

B. The installing contractors, under the direction of the CxA, shall perform Functional Performance Testing of systems and sub-system performance after Pre-Functional checks have been completed and all outstanding issues resolved.

C. The installing contractor will perform tests specified in Division 1 commissioning process activity Sections and other sections specifying testing procedures according to approved testing procedures.

1. Verify and test performance using actual conditions whenever possible.
2. Simulate conditions by imposing an artificial load when it is not practical to test under actual conditions. Set and document simulated conditions and methods of simulation. After test, return settings to normal operating conditions.
3. Alter set points when simulating conditions is not practical.

D. The CxA shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the Contractors for review and comment.

E. Deficiencies/Non-Conformance

1. The CxA will record the results of the functional test on the test form. All deficiencies or non-conformance items shall be noted and reported to the Commissioner and Contractors on a standardized form.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
4. As tests progress and a deficiency is identified, the CxA discusses the issue with the executing contractor.
5. When there is no dispute on the deficiency and the contractor accepts responsibility to correct it, the CxA documents the deficiency and the contractor's response and intentions or corrections. The CxA and contractor then proceed to another test or sequence. Once the contractor corrects the deficiency, the test is rescheduled and repeated in the anticipation of correct operation or function. If a deficiency is identified, the cost of retesting will be as per section 3.7.
6. When there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible, the CxA documents the deficiency and the contractor's response. The deficiency is then forwarded to parties assumed to be responsible for the deficiency. Resolutions are made at the lowest management level

possible. Other parties are brought into the discussion as needed. Final interpretive authority is with the AE. Final acceptance authority is with the Commissioner and CxA. The CxA will then document the resolution process. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency. The CxA then reschedules the test as stated in the section above. Costs of retesting are as stated below in the applicable section.

F. Cost of Retesting

1. The cost for the contractor to retest a Prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the CM/GC.
2. For a deficiency identified, not related to any Prefunctional checklist or start-up fault, the following shall apply: The CxA will direct the retesting of the equipment once at no "charge" to the CM/GC for their time. However, the CxA's and Commissioner's time for a second retest will be charged to the CM/GC, who may choose to recover costs from the responsible contractor or subcontractor. Before retesting occurs, the CM/GC will inspect the deficiency and respond to the CA that the issue has been addressed.
3. The time for the CxA and Commissioner to direct any retesting required because a specific Prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back charged to the CM/GC, who may choose to recover costs from the party responsible for misinformation or deficiency.
4. The contractor shall respond in writing to the CxA and Commissioner at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.
5. Any required retesting by any contractor shall not be considered a justified reason for a claim of delay or for a time extension by the CM/GC, contractors or subcontractors.

G. Failure due to Manufacturer Defect

1. If 10% or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CM/GC, CxA or Commissioner. In such case, the Contractor shall provide the Commissioner with the following.
2. Within one week of notification from the CM/GC or Commissioner, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the CM/GC or Commissioner within two weeks of the original notice.
3. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.

4. The CM/GC, CxA or Commissioner will determine whether a replacement of all identical units or a repair is acceptable.
5. Two examples of the proposed solution will be installed by the Contractor and the Contractor will be allowed to test the installations for up to one week, upon which the CxA or Commissioner will decide whether to accept the solution.
6. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

H. Approval

1. The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CxA. The CxA recommends acceptance of each test to the Commissioner using a standard form.

I. Deferred Testing

1. Unforeseen Deferred Testing – If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the Commissioner. These tests will be conducted in the same manner as the seasonal tests, as soon as possible. Services of necessary parties will be negotiated.
2. Seasonal Testing - During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate contractors, with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and record documents due to seasonal testing will be made by the contractor.

3.8 SYSTEMS TO BE COMMISSIONED

A. Refer to individuals sections listed in Section 1.2 – SUMMARY for specific systems to be commissioned.

3.9 OPERATION AND MAINTENANCE MANUALS

A. The specific content and format requirements for the standard O&M manuals are detailed in Division 01. Special requirements for the controls contractor and TAB contractor are found in Division 23.
B. AE Contribution – The AE will include in the beginning of the O&M manuals a separate section describing the systems including the Basis of Design prepared by the AE. They will also provide Simplified professionally drawn single line system diagrams on 8 ½" x 11" or 11" x 17" sheets. These shall include (ex. chillers/hot water system(s), condenser water system, supply air systems, exhaust systems, etc.). These shall show major pieces of equipment such as (ex. pumps, chillers, heat exchangers, control valves, expansion tanks, coils, service valves, etc.).

C. CxA Review and Approval - Prior to substantial completion, the CxA shall review the O&M manuals, documentation and record documents for systems that were commissioned to verify compliance with the Specifications. The CxA will communicate deficiencies in the manuals to the CM/GC, Commissioner or AE, as requested. Upon a successful review of the corrections, the CxA recommends approval and acceptance of these sections of the O&M manuals to the CM/GC, Commissioner or AE. The CxA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. This work does not supersede the AE's review of the O&M manuals according to the AE's contract.

3.10 TRAINING OF CITY OF NEW YORK PERSONNEL

A. The CM/GC and contractors shall be responsible for training coordination, scheduling and ultimately for ensuring that training is completed.
B. The CxA shall oversee the training of City of New York's personnel for commissioned equipment and systems.

1. The CxA shall interview the City of New York's staff to determine the special needs and areas where training will be most valuable. The Commissioner and CxA shall decide how rigorous the training should be for each piece of commissioned equipment. The CxA shall communicate the results to the CM/GC and contractors. Who will in turn communicate to the subcontractors and vendors who also have training responsibilities.
2. In addition to these general requirements, the specific training requirements of City of New York's personnel by contractors, subcontractors and vendors are specified in the individual sections listed in Section 1.2 – SUMMARY.
3. Each Sub and vendor responsible for training will submit a written training plan to the CM/GC and/or contractors for review and approval prior to training. The CM/GC and/or contractors will submit one comprehensive training plan to the CxA and Commissioner.
4. The plan will be reviewed by the CxA and Commissioner. Comments pertaining to its deficiencies will be forwarded to the CM/GC and Contractors. The training plan will be rewritten until approved by the CxA and Commissioner The final approved training plan will cover the following elements:
    a. Equipment (included in training)
    b. Intended audience
    c. Location of training
    d. Objectives
    e. Subjects covered (description, duration of discussion, special methods, etc.)
    f. Duration of training on each subject
    g. Qualified instructor for each subject
    h. Instructor qualifications
    i. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
5. For the primary HVAC equipment, the Controls Subcontractor shall provide a discussion of the control of the equipment during the mechanical or electrical training conducted by each subcontractor or vendor.
6. Training documentation shall include the following items:

a. Copy of the training plan, including schedule, syllabus, and agenda.
b. Copy of the Owner's Program Requirements.
c. Copy of the Basis of Design.
d. Compiled operations manuals.
e. Compiled maintenance manuals.
f. Completed manufacturer training manuals.
g. Red-lined drawings.
h. Other pertinent documents.

7. The CxA develops criteria for determining that the training was satisfactorily completed, including attending some of the training, etc. The CxA recommends approval of the training to the City of New York's personnel using a standard form. The Commissioner signs the approval form/letter template.
8. At one of the training sessions, the CxA presents a presentation discussing the use of the blank functional test forms for re-commissioning equipment
9. Video taping of the training sessions in DVD format will be provided by the CM/GC, with tapes cataloged by the CM/GC and added to the O&M manuals, if required by Division 1 specifications.
10. The mechanical design engineer shall at the first training session present the overall system design concept and the design concept of each equipment section. This presentation shall be one to two hours in length and include a review of mechanical systems using the simplified system schematics (one-line drawings).

3.11 REPORTING

A. The CxA will provide regular reports to the Commissioner, on a pre-determined frequency in accordance with the project schedule. The CxA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through, memos, progress reports, etc.

B. The CxA will keep all documentation and log all commissioning-related issues that require current or future attention including deficiencies. An agreed-upon form will track the status of documentation and testing for each piece of equipment and system.

3.12 COMMISSIONING DOCUMENTATION

A. The CxA oversees and maintains the development of commissioning documentation. The commissioning documentation shall be kept in three ring binders, and organized by system and sub-system when practical. All pages shall be numbered, and a table of contents page(s) shall be provided. The commissioning documentation shall include, but not be limited to, the following:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.

3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for systems, assemblies, equipment, and components to be verified and tested.
4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
5. Certificate of readiness certifying that systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.
8. Verification of testing, adjusting, and balancing reports.
9. Approved final test and balance report for the building being commissioned.
10. All accepted shop drawings of systems equipment. Shop drawings shall be full size sheets folded as required to fit in binders.
11. All pre-functional performance test checklists, signed by personnel performing and/or witnessing test, organized by system and sub-system.
12. All verification and functional performance test checklists/results, signed by personnel performing and/or witnessing test, organized by system and sub-system. This information may be used for calibrating the original energy simulation model. The revised model will be used to create the baseline for energy use in the building.

END OF SECTION

SECTION 024116

BUILDING DEMOLITION

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.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the building demolition as shown on the drawings and/or specified herein including, but not limited to, the following:

1. Demolition and removal of existing building.
2. Disconnecting and capping existing abandoned utility lines.
3. Removal of debris.
4. Filling below grade voids.
5. Protection of existing buildings and shoring of the adjacent building foundations, sidewalks, and sidewalk vaults as required for structural integrity and personal safety.
6. Protection of existing curbs and sidewalks.
7. Temporary covered passageways.
8. Party wall treatment.
9. Rodent control.
10. Maintain (re-route, shore, etc.) all existing utilities and facilities to adjacent buildings which are to remain.

1.3 RELATED SECTIONS

A. LEED Submittals – Section 013329.

B. Construction Waste Management – Section 017419.

C. LEED Requirments 0 Section 018113.

D. Earthwork - Section 312000.

E. Existing Conditions – Section 028013.

F. Existing Conditions – Section 028213.

1.4 QUALITY ASSURANCE

A. The Contractor shall comply with the requirements of all applicable Federal, State, and local safety and health regulations regarding the demolition of structures, including ANSI/NFPD 241 - Building Construction and Demolition Operations.

B. The Contractor shall be responsible for any damage to any adjacent buildings to remain.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements:

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Division 1 "Sustainable Design Requirements" of these specifications.
   b. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
   c. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
   d. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material
   e. Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

2. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Prior to beginning work, prepare a careful study of the building to be demolished and map out a definite plan of procedure before demolition is begun, for review of the Commissioner.

1.6 SPECIAL PRECAUTION

A. Lead Paint and Asbestos Dangers in Demolition: refer to Existing Conditons Section 028013, Allowance for Incidnetal Asbestos, and Section 028213, Asbestos Abatement.

Take adequate precautions (including bagging of asbestos for disposal and protective equipment, such as properly functioning respirators) against injury of Contractor's personnel or public from the following:

1. Any material which is likely to contain crocidolite (blue asbestos).

2. Inhaling large amounts of lead fumes by welding operations (burning through) at the steel beams coated with accumulation of lead-containing paint.

1.7 JOB CONDITIONS

A. Buildings and other structures to be demolished will be vacated and discontinued in use prior to the start of the work.

B. Condition of Structures

1. The City of New York assumes no responsibility for the actual condition of structures to be demolished.

2. Conditions existing at the time of inspection for bidding purposes will be maintained by the City of New York insofar as practicable.

C. Partial Removal

1. Items of salvageable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the site as they are removed.

2. Storage or sale of removed items on the site will not be permitted.

D. Explosives: The use of explosives will not be permitted.

E. Traffic

1. Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

2. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

F. Protection

1. Ensure the safe passage of persons around the area of demolition.

2. Erect temporary covered passageways as required by authorities having jurisdiction.

3. Provide interior and exterior shoring, bracing, or supporting to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain. The Contractor shall engage a Professional Engineer licensed to advise on

bracing, shoring, underpinning, or other structural requirements. The Contractor shall bear all responsibility for prevention of movement or other structural fault.

4. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the City of New York.

G. Utilities

1. Maintain any existing utilities required to remain; keep in service and protect against damage during demolition operations.

2. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities.

3. The Contractor shall arrange to shut off utilities serving the structure. Disconnect and seal the abandoned utilities before starting demolition operations. Coordinate all work with local utility companies having jurisdiction.

H. Rodent Control: Employ a certified exterminator and treat the entire building in accordance with governing health regulations.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1 DEMOLITION

A. Pollution Controls

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.

a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

2. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start of the work.

3. Provide drainage for temporary water use.

B. Building Demolition

1. Demolish building completely and remove from the site. Use such methods as required to complete the work within the limitation of governing regulations.

2. Proceed with demolition in a systematic manner, from the top of the structure to the ground. Complete demolition work above each floor or tier before disturbing supporting members on lower levels.

3. Demolish concrete and masonry in small sections.

4. Remove structural framing members and lower to ground by means of hoists, derricks, or other suitable methods.

5. Break up and remove concrete slabs on grade at street level.

6. Locate demolition equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

C. Rubble Backfill

1. Buildings shall be demolished down to underside of existing street level grade slabs, which shall be broken up and removed. Cellar slabs on below grade earth shall be broken up and displaced so as not to create a reservoir.

2. The Contractor shall remove debris and equipment of every kind except masonry and concrete from the cellars or basements of the buildings. Concrete cellar floors on earth or fill shall be broken up to permit drainage, but need not be removed.

3. The Contractor shall fill areaways basements, and cellars to a level no lower than six (6) inches below sidewalk grade with clean acceptable masonry and concrete rubble.

4. Only masonry or concrete materials will be permitted to remain on the site for fill.

5. When quantity of acceptable rubble is insufficient to fill such openings, the Contractor shall install additional acceptable material for this purpose.

D. Relics and antiques (i.e. cornerstones, plaques, tablets, etc.) and similar objects remain the property of the City of New York. Notify Commissioner prior to removal and obtain acceptance regarding removal method.

E. Pump out buried tanks located outside building proper. Remove tanks and service piping where tanks interfere with new construction. Fill tanks with sand or fine gravel and cover with fill where tanks may be left in place.

3.2 DISPOSAL OF DEMOLISHED MATERIALS

A. General

1. Remove from the site debris, rubbish, and other materials resulting from demolition operations that are not acceptable as fill material.

2. Burning of removed materials from demolished structures will not be permitted on the site.

B. Removal: Transport materials removed from demolished structures and legally dispose of off site. Leave the site in an orderly condition to the approval of the Commissioner.

END OF SECTION

SECTION 024119

SELECTIVE DEMOLITION AND ALTERATION WORK

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the selective demolition and alteration work as shown on the drawings and/or specified herein, including but not limited to the following:

1. Alterations, selective demolition and removals as noted on drawings and as required to accommodate new construction.

2. Removal of debris.

3. Protection of existing building and spaces to remain, and shoring of the structure as required for structural integrity and personal safety.

4. Protection of existing curbs and sidewalks.

5. Temporary coverage passageways.

6. Alterations, selective demolition and removals of exterior facade where noted.

7. Patching and refinishing of existing surfaces damaged as a result of this work.

8. Protection.

1.3 QUALITY ASSURANCE

A. The Contractor shall comply with the requirements of all applicable Federal, State and local safety and health regulations regarding the demolition of structures including ANSI/NFPD 241-Building Construction and Demolition Operations.

B. The Contractor shall be responsible for any damage to any adjacent structures or buildings to remain.

C. Qualifications: Qualifications of Contractor for work of this Section shall not be less than three (3) years of field experience in work of this nature.

D. Professional Engineering: 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 underpinning and shoring.

1.4 RELATED SECTIONS

A. LEED Submittals – Section 013329.

B. Construction Waste Management – Section 017419.

C. LEED Requirments 0 Section 018113.

D. Alteration and removal requirements for mechanical and electrical work - Mechanical and Electrical Sections.

E. Earthwork - Section 312000.

F. Existing Conditions – Section 028013.

G. Existing Conditions – Section 028213.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements:

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Division 1 "Sustainable Design Requirements" of these specifications.
   b. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
   c. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.

d. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material
e. Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

2. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Schedule of Demolition Operations: Submit demolition procedures and operational sequence for Commissioner's review prior to start of work. Submit a written request to Commissioner well in advance of executing any cutting or alteration which affects:

1. The work of tying in or connecting to operational systems of the building, including electrical, mechanical and security systems.

2. The work of the City of New York or any separate Contractor.

3. The structural value or integrity of any element of the project or of adjacent structures.

4. The integrity or effectiveness of weather-exposed and moisture-resistant elements or systems.

5. The efficiency, operational life, maintenance, or safety of operational elements or systems.

C. Notice of Differing Conditions: Submit a written notification if, during the work of demolition and cutting, conditions are discovered which significantly vary from those shown on the drawings. Do not commence work until approval of Commissioner.

D. Shop Drawings: Submit the following prior to starting work:

1. Submit for Commissioner's information shop drawings indicating location and typical construction details of temporary dustproof and weatherproof partitions.

2. Submit drawings of temporary structural shoring, bracing, framing or support, for the information of the Commissioner. Such drawings will be reviewed by the Structural Engineer for the effects of such temporary members on the structural elements to remain. These drawings shall include the reason for such temporary members, the location, the direction and magnitude of design reaction forces on existing structure, and details showing how these reaction forces will be applied to the existing structure.

a. Shop drawings shall be submitted with the Seal of the P.E. engaged by Contractor; P.E. must be licensed in the State of New York.
b. The Commissioner will receive acknowledgment for concepts shown. Such acknowledgments shall be of the concept only and not of actual capacities or

structural design and shall not in any way diminish or limit the Contractor's responsibility for the quality and performance of the work and for protecting existing structures and facilities.

1.6 SPECIAL PRECAUTION

A. Hazardous materials may be encountered during demolition operations including asbestos; comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution. Refer to Existing Conditons Section 028013, Allowance for Incidnetal Asbestos, and Section 028213, Asbestos Abatement.

1.7 JOB CONDITIONS

A. Condition of Structure

1. The Contractor for the work of this Section shall be held to have visited the site, examined the premises, determined for himself the existing conditions, character of equipment and facilities needed for the performance of the work, and all matters which may in any way affect the work before submitting a bid.

a. Information regarding existing construction or conditions is based on available record drawings which may or may not truly reflect existing conditions. Such information is included on the assumption that it may be of interest to the Contractor, but the Commissioner, City of New York and their consultants do not assume responsibility for its accuracy or completeness.
b. Notify the Commissioner if, during the course of demolition, conditions are discovered which significantly vary from those shown on the drawings. Do not proceed until authorized by Commissioner.

2. The Contractor shall accept the condition of the site and structures as found. The Commissioner and City of New York assume no responsibility for condition of site or structures nor the continuation of the condition existing at time of bidding or thereafter.

B. Areas of building to be demolished or altered will be vacated and discontinued in use prior to the start of the work.

1. Surrounding areas of the building shall remain operational by the City of New York.

C. Partial Removal

1. Items of savable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the site as they are removed.

2. Storage or sale of removed items on the site will not be permitted.

D. Explosives: The use of explosives will not be permitted.

E. Traffic

1. Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.

2. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

F. Utilities

1. Refer to Division 22 and 26 of the specifications for special requirements concerning utilities and services.

2. Maintain any existing utilities required to remain; keep in service and protect against damage during demolition operations.

3. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities.

4. Disconnect and seal any abandoned utilities before starting demolition operations. Coordinate all work with local utility companies having jurisdiction.

1.8 SCHEDULING

A. Before commencing any alteration or demolition work, submit for review by the Commissioner, and approval of the City of New York, a schedule showing the commencement, the order, and the completion dates for the various parts of this work.

B. Before starting any work relating to existing utilities (electrical, sewer, water, heat, gas, fire lines, etc.) that will temporarily discontinue or disrupt service to the structures to remain, notify the Commissioner and the City of New York 7 days in advance and obtain the City of New York's approval in writing before proceeding with this phase of the work.

PART 2 PRODUCTS

Refer to Part 3 - Execution, for Product Requirements

PART 3 EXECUTION

3.1 PROTECTION

A. Take full precautions to protect workmen, passersby or any other persons from falling debris and other hazards of demolition operations.

B. Execute demolition work to insure protection of existing portions of building to remain against damages which might occur from falling debris or other cause. Do not interfere

with use of adjacent occupied buildings and areas. Maintain free, safe passage to and from occupied adjacent buildings.

C. Materials Placement: Do not load structure with weight that will endanger, overload or cause excessive deflection of the existing structure, or that will damage finished surfaces adjacent to and/or supported by the existing structure, except portions being removed.

D. Construction Operations: Do not employ any construction operation, equipment or vehicles that will endanger, overload or cause excessive deflection of the existing structure, or that will damage finished surfaces adjacent to and/or supported by the existing structure, except portions being removed.

E. Take precautions to guard against movement, settlement, damage, or collapse of any part of building, sidewalks, adjacent property or street passages; be liable for any such movement, settlement or collapse. If such damage does accidentally occur, Contractor shall repair promptly at no cost to City of New York.

F. Provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the work and property at all times, including Saturdays, Sundays, and holidays.

G. Be responsible for any and all damages which may arise or occur to any party whatsoever by reason of the neglect in providing proper lights, guards, barriers, or any other safeguards to prevent damage to property, life and limb.

H. Make such explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. Give particular attention to shoring and bracing requirements so as to prevent any damage to existing construction.

1. Provide interior and exterior shoring, bracing, or support to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain. The Contractor's Professional Engineer shall advise on bracing, shoring, underpinning, or other structural requirements. The Contractor shall bear all responsibility for prevention of movement or other structural fault.

2. The Contractor shall restore, by repair or otherwise, the portions of structure or their contents altered by the Contractor in furtherance of his underpinning and support operations. Restoration shall be completed to the conditions which existed prior to the start of the work. Any damage caused by inadequate support shall also be restored by the Contractor at no cost to the City of New York.

I. Provide, erect and maintain catch platforms, lights, barriers, weather protection, warning signs, and other items as required for proper protection of the workmen engaged in demolition and alteration operations, occupants of the building, public and adjacent property. Any damage caused by the Contractor's operations shall be promptly repaired by the Contractor at no cost to the City of New York.

J. Provide and maintain temporary protection of the existing structure designated to remain where demolition, removal, and new work are being done, connections made, materials handled, or equipment moved.

K. Take necessary precautions to prevent dust and dirt from rising. Protect unaltered portions of the existing building affected by the operations under this Section by dustproof partitions and other adequate means.

L. Provide adequate fire protection in accordance with local Fire Department requirements.

M. Do not close or obstruct walkways, passageways, or stairways. Do not store or place materials in passageways, stairs, or other means of egress. Conduct operations with minimum traffic interference.

N. Be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.

O. Erect temporary covered passageways at street level as required by authorities having jurisdiction.

P. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the City of New York.

Q. Provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.

3.2 INSPECTION

A. Verify that areas of demolition work are protected and temporary dustproof partitions have been installed.

B. Verify that construction to be removed is not load bearing or has been properly braced, framed or supported.

C. Inspect existing conditions of the project, including elements subject to damage or to movement during demolition and cutting.

D. After uncovering work, inspect the conditions affecting the installation or performance of the work.

1. Report differing or questionable conditions to the Commissioner in writing; do not proceed with the work until the Commissioner has provided further instructions.

3.3 PREPARATION

A. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work

B. Provide devices and methods to protect other portions of the project from damage.

C. Pollution Controls

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.

   a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

2. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start of the work.

3. Provide drainage for temporary water use.

3.4 DEMOLITION AND CUTTING

A. Selectively demolish existing construction in conformance with the drawings and these specifications.

1. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surface to receive installation of work by others and patching of finish surfaces.

2. Do all cutting or removal so as to leave neat, true, plumb and square edges, at edges to remain. Use carborundum or diamond saw equipment for cutting masonry, concrete and stone work, where edges or surfaces are to remain.

3. Do not cut or remove construction which might weaken or impair the structural integrity or strength of the structural framing or support systems which are to remain.

4. Demolish and remove materials as shown on the drawings without damage to the remaining parts of the structure or mechanical/electrical/utility systems.

5. Remove materials so as to not impose excessive loads in supporting walls, floors or framing and so as not to damage remaining undemolished portions of the structure.

6. Where portions of structures are to be removed, remaining portions shall be protected from damage and prepared to fit new construction. Damage to portions of structures to remain shall be repaired.

7. Reinforcing steel in existing structures shall be left in place, cleaned and aligned to provide tie with new work.

8. Existing waterproofing systems and flashings shall be carefully exposed and protected to maintain workable conditions of fitting new work with existing construction.

9. Proceed with demolition in a systematic manner.

10. Demolish concrete and masonry in small sections.

11. Remove structural framing members and lower to ground by means of hoists, derricks, or other suitable methods.

B. Shoring

1. Design, provide, erect and maintain necessary temporary shoring, bracing, framing, or support where load bearing structural or supporting members are removed or weakened by cuts or openings or are subject to damage from demolition operations, and otherwise as required for safety or to protect finish surfaces from damage.

2. Construction and adequacy of the shoring shall be the entire responsibility of the Contractor. Any damage caused by the inadequacy of the shoring or other support shall be the responsibility of the Contractor to remedy at no additional expense to the City of New York.

3. Shoring and bracing shall remain until new structural framing and/or supports are installed. Coordinate operations fully with other trades.

4. Be ready at any time to promptly provide, add to, or strengthen temporary shoring, bracing, or support for existing work, in case existing construction begins to show signs of structural stress.

3.5 WORKMANSHIP STANDARDS FOR ALTERATION AND REMOVAL WORK

A. Cut, remove, alter, temporarily remove and replace, or relocate existing work as required for performance of the work. Perform such work required with due care, including shoring and bracing.

B. Coordinate patching involving the various trades whether or not specifically mentioned in the respective specification Sections.

C. Materials or items demolished and not designated to become the property of the City of New York or to be reinstalled shall become the property of the Contractor and shall be removed from the City of New York's property.

D. Execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the adjacent buildings.

E. In general, demolish masonry in small sections. Where necessary to prevent collapse of any construction, install temporary shores, struts, or bracing.

F. Materials to be removed by existing elevators shall be put in enclosed containers.

G. Where existing equipment and/or fixtures are indicated to be reused, repair such equipment and/or fixtures and refinish to put in perfect working order. Refinish as directed.

H. Cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.

I. Confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the new work. Cut and fold back existing roofing. Cut and remove insulation and related items. Provide temporary weathertight protection as required until new roofing and flashings are installed. Consult the City of New York to ascertain if existing guarantee bonds are in force and execute the work so as not to invalidate such bonds.

J. Where utilities are removed, relocated or abandoned, cap, valve, plug, or by-pass to make complete and working installation.

K. Restore existing pipe and duct coverings damaged by work under this Contract to original undamaged condition.

L. Immediately restore to service and repair any damage caused by Contractor's workmen to existing pipe and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems which are not scheduled for discontinuance or abandonment.

M. Upon completion of contract, deliver work complete. Damage that may be caused by Contractor or Contractor's workmen to existing structures designated to remain, grounds, and utilities shall be repaired by Contractor and left in as good condition as existed prior to damaging.

N. Restore finish work of floors, walls, and ceilings remaining in place but damaged or defaced because of demolition or alteration work to condition equal that which existed at beginning of work under this Contract.

O. Where alteration or removals expose damaged or unfinished surfaces or materials, refinish such surfaces or materials, or remove them and provide new or salvaged materials to make continuous surfaces uniform.

P. Perform new work and restore and refinish existing work in conformance with applicable requirements of the specifications, except as follows:

1. Materials for use in repair of existing surfaces, but not otherwise specified, shall conform to the highest standards of the trade involved, and be in accordance with approved industry standards, and shall be as required to match existing surfaces.

2. Workmanship for repair of existing materials shall, unless otherwise specified, be equal to similar workmanship existing in or adjacent to the space where the work is being done.

3. Installation of salvaged items where no similar items exist shall be done in accordance with the highest standards of the trade involved and in accordance with approved shop drawings.

Q. Materials or items designated to become the property of the City of New York shall be as shown on the drawings. Remove such items with care and store them in a location at the site to be designated by the City of New York.

R. Materials or items designated to be reinstalled shall be as shown on the drawings. Remove such items with care under the supervision of the trade responsible for reinstallation; protect and store until required. Replace materials or items damaged in their removal with similar new material.

S. The existing building shall not be used as a work shop. Neither shall the furnishings or equipment in any room be used as work benches. Should any damage occur during the progress of the work to any furniture, fixtures, equipment, or appurtenances therein, such damage shall be repaired, replaced or made good by the Contractor without extra cost to the City of New York.

T. Where removing existing floor finish and base, remove all adhesive and leave floors and walls smooth and flush, ready to receive new finish.

U. Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease and loose paint before refinishing.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General

1. Remove from the site debris, rubbish and other materials resulting from work of this Section.

2. Burning of removed materials from demolished structures will not be permitted on the site.

B. Removal: Transport materials removed from demolished structures and legally dispose of off site. Pay any and all fees associated with disposal work. Leave the site in an orderly condition to the approval of the Commissioner.

3.7 CLEANING UP

A. Remove debris as the work progresses. Maintain existing premises in a neat and clean condition.

END OF SECTION

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SECTION 028013 – GENERAL CONTRACTOR WORK

ALLOWANCE FOR INCIDENTAL ASBESTOS ABATEMENT

1.01 SCOPE FOR ASBESTOS ABATEMENT WORK

A. The "General Conditions" apply to the work of this Section.

B. The Asbestos abatement contractor shall remove asbestos containing materials as needed to perform the other work of this Contract when discovered during the course of work. When required, the Asbestos abatement contractor shall replace the ACM with non-asbestos containing materials. An allowance of **$15,000.00** for the **General Contractor** is herein established for this incidental work when so ordered and authorized by the Commissioner.

C. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF THE RULES AND REGULATIONS OF THE ASBESTOS CONTROL PROGRAM AS PROMULGATED BY TITLE 15 CHAPTER I OF RCNY AND NEW YORK STATE DEPARTMENT OF LABOR INDUSTRIAL CODE RULE 56 CITED AS 12 NYCRR, PART 56 WHICHEVER IS MORE STRINGENT AS PER LATEST AMENDMENTS TO THESE LAWS AND AS MODIFIED HEREIN BY THESE SPECIFICATIONS.

D. ALL DISPOSAL OF ASBESTOS CONTAMINATED MATERIAL SHALL BE PER LOCAL LAW 70/85.

E. THE ASBESTOS ABATEMENT CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT CERTAIN METHODS OF ASBESTOS ABATEMENT ARE PROTECTED BY PATENTS. TO DATE, PATENTS HAVE BEEN ISSUED WITH RESPECT TO "NEGATIVE PRESSURE ENCLOSURE" OR "NEGATIVE-AIR" OR "REDUCED PRESSURE" AND "GLOVE BAG".

F. THE ASBESTOS ABATEMENT CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR AND SHALL HOLD THE DEPARTMENT OF DESIGN AND CONSTRUCTION AND THE CITY HARMLESS FROM ANY AND ALL DAMAGES, LOSSES AND EXPENSES RESULTING FROM ANY INFRINGEMENT BY THE ASBESTOS ABATEMENT CONTRACTOR OF ANY PATENT, INCLUDING BUT NOT LIMITED TO THE PATENTS DESCRIBED ABOVE, USED BY THE ASBESTOS ABATEMENT CONTRACTOR DURING PERFORMANCE OF THIS AGREEMENT.

G. "Asbestos" shall mean any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumingtonite-grunerite), crocidolite (riebeckite), tremolite, anthrophyllite and actinolite.

H. Prior to starting, the Asbestos abatement contractor must notify the Commissioner of the Department of Design and Construction if he/she anticipates any difficulty in performing the Work as required by these Specifications. The Asbestos abatement contractor is responsible to prepare and submit all filings, notifications, etc. required by all City, State and Federal regulatory agencies having jurisdiction.

The Asbestos abatement contractor is responsible for submitting the Asbestos Project Notification Form (ACP-7 Form) to the Department of Environmental Protection, Asbestos Control Program, as per Title 15, Chapter I of RCNY and to the NYSDOL as per Industrial Code Rule 56.

The Asbestos abatement contractor is responsible for preparing, and submitting Asbestos Variance Application (ACP-9). If a Variance is required, the Asbestos abatement contractor is responsible to retain a NYSDOL Asbestos Project Designer, as defined in Title 15, Chapter 1 of the RCNY to prepare and submit the required variance.

The Asbestos abatement contractor is responsible for preparing and submitting an Asbestos Abatement Permit and/or Work Place Safety Plans (WPSP) that may be required for the completion of the Contract or incidental work. If such plans are required, the Asbestos abatement contractor is responsible to retain a NYSDOL Licensed Design Professional as defined in Title 15, Chapter 1 of the RCNY to prepare and submit the required plans.

The Asbestos abatement contractor is responsible for the submission of all required documents to the NYCDEP to acquire the appropriate Asbestos Project Conditional Closeout (ACP-20) and/or Asbestos Project Completion Forms (ACP-21) on a timely basis for the completion of the incidental work encountered under this contract.

The Asbestos abatement contractor will be required to attend an on-site job meeting with the Construction Project Manager prior to the start of work to examine conditions and plan the sequence of operations, etc.

The Asbestos abatement contractor shall have a NYSDOL/NYCDEP Asbestos Supervisor onsite to oversee the work and conduct a final visual inspection as required by both Title 15, Chapter 1 of the RCNY and NYSDOL Industrial Code Rule 56.

I. All work shall be done during regular working hours unless the Asbestos abatement contractor requests authorization to work in other then regular working hours and such authorization is granted by the Commissioner. (Regular work hours are those hours during which any given facility, in which work is to be done, is customarily open and functioning, normally between the hours of 8:00 A.M. and 4:00 P.M. Monday - Friday.) If such work schedule is authorized by the Commissioner, the work shall be done at no additional cost to the City.

J. The Commissioner may order that work be done in other than regular working hours as herein by defined and this order may require the Asbestos abatement contractor to pay premium or overtime wages to complete the work. If the Commissioner orders work in other than regular working hours, the Asbestos abatement contractor shall multiply the unit price for that portion of the work requiring premium wages by 1.50 when computing payment in accordance with Paragraph 1.09. All requests for premium payment must be supported by certified payroll sheets and field sheets approved by the Construction Project Manager.

1.02 QUALIFICATIONS OF ASBESTOS ABATEMENT CONTRACTOR

A. Requirements: The asbestos abatement contractor must demonstrate compliance with the special experience requirements set forth in subparagraphs (1) through (5) below. The asbestos abatement contractor must, submit documentation demonstrating compliance with all listed requirements. Such documentation shall include without limitation, all required licenses, certificates, and documentation.

1. The asbestos abatement contractor must, whether an individual, corporation, partnership, joint venture or other legal entity, must demonstrate for the three year period prior to the work, that it has been licensed by the New York State Department of Labor, as an "Asbestos abatement contractor".

2. The asbestos abatement contractor must, for the three year period prior to the work, have been in the business of providing asbestos abatement services as a routine part of its daily operations.

3. The asbestos abatement contractor proposing to do asbestos abatement work must be thoroughly experienced in such work and must provide evidence of having successfully performed and completed in a timely fashion at least five (5) asbestos abatement projects of similar size and complexity. The aggregate cost of these projects must be at least $250,000.00 in each of the three years.

4. For each project submitted to meet the experience requirements set forth above, the asbestos abatement contractor must submit the following information for the project; name and location of the project; name title and telephone number of the owner or the owner's representative who is familiar with the asbestos abatement contractor's work, brief description of the work completed as a prime or sub-asbestos abatement contractor; amount of contract or subcontract and the date of completion.

5. The asbestos abatement contractor must demonstrate that it has the financial resources, supervisory personnel and equipment necessary to carry out the work and to comply with the required performance schedule, taking into consideration other business commitments. The asbestos

abatement contractor must submit such documentation as may be required by the Department of Design and Construction to demonstrate that it has the requisite capacity to perform the required services of this contract.

B. Insurance Requirements: The asbestos abatement contractor must provide asbestos liability insurance in the following amount: 1 million dollars per occurrence, 2 million dollars aggregate (combined single limit). The City of New York shall be named as an additional insured on such insurance policy.

C. Throughout the specifications, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics thereof.

1.03 ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITIES

The Asbestos abatement contractor will visit the subject location within one (1) working day of notification to ascertain actual work required. If the project is identified as being "urgent", then work shall commence no later than 48 hours from the time of notification. In this event, the asbestos abatement contractor shall immediately notify when applicable EPA NESHAPS Coordinator, NYSDOL Asbestos Control Bureau and NYCDEP Asbestos Control Program of start of the work and file the necessary Asbestos Notifications and any applicable Variance Applications with the regulatory agencies cited above.

In the event that the project is not classified as "urgent" the Asbestos abatement contractor shall notify the EPA NESHAPS Coordinator, NYSDOL and NYCDEP by submitting the requisite asbestos project notification forms, postmarked 10 days before activity begins if 260 linear feet or more and/or 160 square feet or more of asbestos containing material will be disturbed.

The following information must be included in the notification:

A. Name and address of building City or operator;

B. Project description:

1. Size - square feet, number of linear feet, etc;

2. Age - date of construction and renovations (if known);

3. Use - i.e., office, school, industrial, etc.

4. Scope - repair, demolition, cleaning, etc.

C. Amount of asbestos involved in work and an explanation of techniques used to determine the amount;

D. Building location/address, including Block and Lot numbers;

E. Work schedule including the starting and completion dates;

F. Abatement methods to be employed;

G. Procedures for removal of asbestos-containing material;

H. Name, title and authority of governmental representative sponsoring project.

1.04 WORK INCLUDED IN UNIT PRICE

The Asbestos abatement contractor will be paid a basic unit price of **$25.00** per square feet for the removal and disposal of asbestos containing material and replacement of the same with non-asbestos containing materials.

Unit price shall include all costs necessary to do the work of this Contract, including but not limited to: labor, materials, equipment, utilities, disposal, insurance, overhead and profit.

1.05 AIR MONITORING – ASBESTOS ABATEMENT CONTRACTOR

A. "Air Sampling" shall mean the process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure utilized for asbestos follows the N1OSH Standard Analytical Method 7400 or the provisional transmission electron microscopy methods developed by the USEPA and/or National Institute of Standard and Technology which are utilized for lower detectability and specific fiber identification.

B. Air monitoring of Asbestos abatement contractor's personnel will be performed in conformance with OSHA requirements, (All costs associated with this work are deemed included in the unit price.).

C. Qualifications of Testing Laboratory:

The industrial hygiene laboratory shall be a current proficient participant in the American Industrial Hygiene Association (AIHA) PAT Program. The laboratory identification number shall be submitted and approved by the City. The laboratory shall be accredited by the AIHA and New York State Department of Health Environmental Laboratory Approval Program (ELAP).

Note: Work area air testing and analysis before, during and upon completion of work (clearance testing) will be performed by a Third Party Air Monitor under separate Contract with the City.

1.06 THIRD PARTY MONITORING AND LABORATORY

A. The NYCDDC, at its own expense, will employ the services of an independent Third Party Air Monitoring Firm and Laboratory. The Third Party Air Monitor will perform air sampling activities and project monitoring at the Work Site.

B. The Laboratory will perform analysis of air samples utilizing Phase Contrast Microscopy (PCM) and/or Transmission Electron Microscopy (TEM).

C. The Third Party Air Monitoring Firm and the designated Project Monitor shall have access to all areas of the asbestos removal project at all times and shall continuously inspect and monitor the performance of the Asbestos abatement contractor to verify that said performance complies with this Specification. The Third-Party Air Monitor shall be on site throughout the entire abatement operation.

D. The NYCDDC will be responsible for costs incurred with the Third Party Air Monitoring Firm and laboratory work. Any subsequent additional testing required due to limits exceeded during initial testing shall be paid for by the Asbestos abatement contractor.

1.07 PAYMENT REQUEST DOCUMENTATION

B. The following information shall be included for each payment request:

1. Description of work performed.
2. Linear footage and pipe sizes involved.
3. Square footage for boiler & breaching insulation removed.
4. Square footage of non pipe and boiler areas removed, patched, enclosed, sealed, or painted.
5. Square footage of encapsulation, sealing, patching, and painting involved.
6. Total cost associated with compliance with the assigned task.
7. Architectural, Electrical, HVAC, Plumbing, etc. work incidental to the Asbestos Abatement Work.
8. A certified copy (in form 4312-39) to the Comptroller or Financial Officer of the New York City to the effect that the financial statement is true.
9. A signed copy (in form 6506q-6) of certificate of compliance with non-discriminatory provisions of the Contract.

10. Attach a copy of valid workmen compensation insurance.

11. Valid asbestos insurance per occurrence.

12. General liability insurance when required.

C. Each payment request shall include a grand total for all work completed that billing period, the landfill waste manifests and a copy of waste transporter permit. The Department of Design and Construction will inspect the work performed, review the cost and approve or disapprove requests for payment.

D. EXPOSURE LOG: With this final payment, the Asbestos abatement contractor shall submit a listing of the names and social security numbers of all employees actively engaged in the abatement work of this Contract. This list shall include a summary showing each part of the abatement work in which the employee was engaged and the dates thereof.

1.08 QUANTITY CALCULATIONS

In order to determine the square footage involved for the various pipe sizes of pipe insulation that might be encountered, the following table is to be used.

PIPE INSULATION SIZE O.D.	PIPE SIZE O.D.	SQUARE FOOTAGE PER LINEAR FOOT
2-1/2"	1/2"	0.65
2-3/4"	3/4"	0.72
3"	1"	0.79
3-1/4"	1-1/4"	0.85
3-1/2"	1-1/2"	0.92
4"	2"	1.05
4-1/2"	2-1/2"	1.18
5"	3"	1.31
6"	3-1/4"	1.57
7"	3-1/2"	1.83
8"	4"	2.09
9"	5"	2.36
10"	6"	2.62
12"	8"	3.14
14"	10"	3.67
16"	12"	4.19
18"	14"	4.71

1.09 METHOD OF PAYMENT

Payment shall be made in accordance with Items A through R below. Payment shall be calculated based on the actual quantity of the item performed by the asbestos abatement

contractor, times the unit price specified below. Credits may apply to certain times, as specified below.

A. **REMOVAL, DISPOSAL AND REPLACEMENT OF ASBESTOS CONTAINING PIPE INSULATION:** Actual linear footage, multiplied by the square footage factor listed for the respective pipe size in Section 1.09, multiplied by the unit price in Section 1.05.

EXAMPLE: 100 lin.ft. of 1/2" pipe and 100 lin.ft. of 6" pipe, including elbows, tees. Flanges, etc.

100 X 0.65 = 65 sq.ft. 65 x unit price = Payment

100 X 2.62 = 262 sq.ft. 262 x unit price = Payment

B. **REMOVAL, DISPOSAL AND REPLACEMENT OF BOILER INSULATION:** (all types including Silicate Block and including the removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.

EXAMPLE: Item B. removal and replacement of 1000 S.F. of boiler insulation (incl. Silicate block)

1000 S.F. X (1.5) X the Unit Price = Payment

C. **REMOVAL, DISPOSAL AND REPLACEMENT OF TANK INSULATION:** (all types including removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.

D. **REMOVAL, DISPOSAL AND REPLACEMENT OF BOILER UPTAKE, & BREACHING INSULATION:** (all types including stiffening angles and wire lath) Payment shall be made at 2.0 times the unit price per square foot.

E. **REMOVAL, DISPOSAL AND REPLACEMENT OF DUCT INSULATION:** Payment shall be made at 1.0 times the unit price per square foot.

F. **REMOVAL, DISPOSAL AND REPLACEMENT OF SOFT ASBESTOS CONTAINING MATERIAL:** (Including sprayed-on fire proofing and sound proofing) Payment shall be made at 1.0 times the unit price per square foot of surface area. Area of irregular surfaces must be calculated and confirmed with DDC representative.

G. **ACOUSTIC PLASTER REPAIR AND/OR ENCAPSULATION:** Payment shall be made at 0.5 times the unit price per square foot.

H. **PATCHING OR REPAIR** of items listed in A through F will be paid at 0.33 times the unit price per square foot.

I. **REMOVAL, DISPOSAL AND REPLACEMENT OF WATERPROOFING ASBESTOS CONTAINING MATERIAL:** (including friable and non-friable waterproofing material from interior and exterior walls, floors, foundations, penetrations, louvers, vents and openings other than windows, doors and skylights) Payment shall be made at 0.5 times the unit price per square foot.

J. **REMOVAL, DISPOSAL AND REPLACEMENT OF ASBESTOS CONTAINING ELECTRICAL WIRING INSULATION:** (including friable and non-friable wiring insulation) Payment shall be made at 0.33 times the unit price per square foot.

K. **PAINTING:** Payment shall be made at 0.05 times the unit price per square foot.

L. **REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING PLASTER:** from ceilings and walls, including any wire lath and disposal as asbestos containing waste. Payment shall be made at 0.80 times the unit price per square foot.

M. **REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING FLOOR TILES, CEILING TILES, TRANSITE PANELS:** (including any adhesive, glue, mastic and/or underlayment) and disposal as asbestos containing waste. Payment shall be made at 0.40 times the unit price per square foot. If multiple layers are discovered, each additional layer shall be paid at 0.20 times the unit price per square foot.

N. **ADDITIONAL CLEAN UP/HOUSEKEEPING OF WORK AREA:** (excluding pre-cleaning of work area required by regulations) HEPA vacuuming and wet cleaning of asbestos contaminated surface. Payment shall be made at 0.20 times the unit price per square foot. When GLOVE BAG is employed to remove ACM, cost of HEPA vacuuming and wet cleaning of floor area up to 3 feet on each side of glove-bag shall be included in unit price and no extra payment will be made.

O. **REMOVAL, DISPOSAL OF ASBESTOS-CONTAINING ROOFING MATERIAL:** including mastic, flashing and sealant compound and provide temporary asbestos-free roof covering consisting of one layer of rolled roofing paper sealed with asphaltic roofing compound. Payment shall be made at 0.8 times the unit price per square foot. Credit at a rate of 0.33 times the unit price will be taken for each square foot of temporary roof covering which the Asbestos abatement contractor is directed not to install.

P. **PICK-UP AND DISPOSAL OF GROSS DEBRIS:** (excluding any waste generated from abatement under Item A-R) at a rate of $150 per cubic yard for asbestos contaminated waste and $75 per cubic yard for non-asbestos contaminated waste. This cost includes all labor and material cost associated with work.

Q. **REMOVAL OF ASBESTOS-CONTAINING BRICK, BLOCK, MORTAR, CEMENT OR CONCRETE:** along with all surfacing materials including wire lath and/or other supporting structures and disposal as ACM waste. Payment shall be made at a rate of $25.00 per cubic foot of material removed.

R. **REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING WINDOW/DOOR CAULKING:** including friable and non-friable caulking, weather-stripping, glazing, sealants or other waterproofing materials applied to windows, doors, skylights, etc. Payment shall be made at the rate of $400.00 per opening regardless of size or configuration. This cost includes labor, consumable materials, set-up/breakdown, removal and disposal, as required.

Note 1: CREDIT: For items listed in A through F, a credit at a rate of 0.33 times the unit price, times the respective multiplier (for each item) will be taken for each square foot of insulation which the asbestos abatement contractor is not directed to reapply.

Note 2: MINIMUM PAYMENT: The minimum payment per call at any individual job sites or various job sites during the same day will be eight hundred dollars ($800.00).

Note 3: All payments shall be made as described in paragraph 1.09 herein.

Note 4: WORKING HIGHER THAN 12 FEET ABOVE FLOOR LEVEL OR WORK REQUIRING COMPLEX SCAFFOLDING OR CONSTRUCTION WORK PLATFORMS: Provisions are made in this Contract to compensate the Asbestos abatement contractor for work performed in locations that are difficult to access due to work at elevations that are significantly higher than the normal work level. The unit price for these items will be paid at 1.20 times the unit price described in Paragraphs 1.09, A through R for those portions of the work that are more than twelve (12) feet above the grade for that would be judged as the normal working level.

1.10 GUARANTEE

A. Work performed in compliance with each task shall be guaranteed for a period of one year from the date the completed work is accepted by the Department of Design and Construction.

B. The Commissioner of The Department of Design and Construction will notify the Asbestos abatement contractor in writing regarding defects in work under the guarantee.

1.11 OCCUPANCY OF SITE NOT EXCLUSIVE

Attention is specifically drawn to the fact that contractors, performing the work of other Contracts, may be brought upon any of the work sites of this Contract. Therefore, the Asbestos abatement contractor shall not have exclusive rights to any site of his work and shall fully cooperate and coordinate his work with the work of other contractors who may

be brought upon any site of the work of this Contract. This paragraph applies to those areas outside the regulated Work Area as defined by Title 15, Chapter I of RCNY.

1.12 SUBMITTALS

A. Pre-Construction Submittals:

1. Attend a pre-construction meeting scheduled by the City of New York Department of Design and Construction. This meeting shall also be attended by a designated representative of the City of New York third party air monitoring firm, facility manager and the Construction Project Manager. At this meeting, the Asbestos abatement contractor shall present three copies of the following items:
   a. Asbestos abatement contractor's scope of work, work plan and schedule.

   b. Asbestos project notifications, approved variances and plans to Government Agencies.

   c. Copies of Permits, clearance and licenses if required.

   d. Schedules: the Asbestos abatement contractor shall provide to the Construction Project Manager a copy of the following schedules for approval. Once approved, schedules shall be maintained and updated as received. Asbestos abatement contractor shall post a copy of all schedules at the site:

      (1) A construction schedule stating critical dates of the project including, but not limited to, mobilization, Work Area preparation, demolition, gross removal, fine cleaning, encapsulation, inspections, clearance monitoring, and phase of refinishing and final inspections. The schedule shall be updated biweekly, at a minimum.

      (2) A schedule of staffing stating number of workers per shift per activity, name and number of supervisor(s) per shift, shifts per day, and total days to be worked.

      (3) Submit all changes in schedule or staffing to the Construction Project Manager prior to implementation.

   e. Written description of emergency procedures to be followed in case of injury or fire. This section must include evacuation procedures, source of medical assistance (name and telephone number to nearest

hospital) and procedures to be used for access by medical personnel (examples: first aid squad and physician). NOTE: Necessary Emergency Procedures Shall Take Priority Over All Other Requirements of These Specifications.

f. Material Safety Data Sheets (MSDS) for encapsulants, sealants, firestopping foam, cleaners/disinfectants, spray adhesive and any and all potentially hazardous materials that may be employed on the project. No work involving the aforementioned will be allowed to proceed until MSDS are reviewed.

g. Worker Training and Medical Surveillance: The Asbestos abatement contractor shall submit a list of the persons who will be employed by him /her to perform the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.

h. Logs: Specimen copies of daily progress log, visitor's log, and disposal log.

(1) The Asbestos abatement contractor shall provide a permanently bound log book of minimum 8-1/2" x 11" size at the entrance to the Worker and Waste Decontamination enclosure system as hereinafter specified. Log book shall contain on title page the project name, name, address and phone number of the Asbestos abatement contractor; name, address and phone number of Asbestos abatement contractor and City's third party air monitoring firm; emergency numbers including, but not limited to local Fire/Rescue Department. Log book shall contain a list of personnel approved for entry into the Work Area.

(2) All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted. Any significant events occurring during the abatement project shall be entered into the log. Upon completion of the job, the Asbestos abatement contractor shall submit the logbook containing a day-to-day record of personnel log entries countersigned by the Construction Project Manager every day.

i. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of ACM, understands the health implications and risks

involved; and understands the use and limitations of the respiratory equipment to be used.

B. During Construction Submittals:

1. Security and safety logs showing names of person entering workspace, date and time of entry and exit, record of any accident, emergency evacuation, and any other safety and/or health incident.

2. Progress logs showing the number of workers, supervisors, hours of work and tasks completed shall be submitted daily to the Construction Project Manager.

3. Floor plans indicating Asbestos abatement contractor's current work progress shall be submitted for review by the Construction Project Manager.

4. All Asbestos abatement contractors' air monitoring and inspection results.

C. Project Closeout Submittals:

Upon completion of the project and as a condition of acceptance, the Asbestos abatement contractor shall present two copies of the following items, bound and indexed:

1. Lien Waivers from Asbestos abatement contractor, Sub-Asbestos abatement contractors and Suppliers,

2. Daily OSHA air monitoring results,

3. All Waste Manifests (Asbestos and Construction Debris), seals and disposal logs,

4. Field Sign-In/Sign-Out Logs for every shift,

5. Copies of all Building Department Forms and Permits,

6. A Letter of Compliance stating that all the work on this project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations,

7. All Warranties as stated in the Specifications,

   a. Fully executed disposal certificates and transportation manifest.

8. Project Record: The Asbestos abatement contractor shall maintain a project record for all small and large asbestos projects. During the project, the

project record shall be kept on site at all times. Upon completion of the project, the project record shall be maintained by the building owner. The project record shall be submitted to DDC as part of the close out documents. The project record shall consist of:

a. Copies of licenses of all asbestos abatement contractors involved in the project;

b. Copies of NYCDEP and NYSDOL supervisor and handler certificates for all workers engaged in the project;

c. Copies of all project notifications and reports filed with NYCDEP, NYSDOL and USEPA for the project, with any amendments or variances;

d. Copies of all asbestos abatement permits, including associated approved plans and work place safety plan;

e. A copy of the air sampling log and all air sampling results;

f. A copy of the abatement asbestos abatement contractor's daily log book;

g. Copies of all asbestos waste manifests;

h. A copy of all Project Monitor's Reports (ACP-15).

i. A copy of each ATR-1 Form completed for the asbestos project (if required).

j. A copy of each Asbestos Project Conditional Closeout Report (ACP-20) if required.

k. A copy of the Asbestos Project Completion Form (ACP-21).

1.13 PROTECTION OF FURNITURE AND EQUIPMENT

Cover all furniture and equipment that cannot be removed from Work Areas. Movable furniture and equipment will be removed from Work Areas by the Asbestos abatement contractor prior to start of work. At the conclusion of the work (after final air testing), the Asbestos abatement contractor will remove all plastic covering on walls, floors, furniture, equipment and reinstall furniture and equipment. He shall remove and store all sheaths, curtains and drapes, and reinstall same following final clean up.

SECTION 028213

ASBESTOS ABATEMENT

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contract Documents are as defined in the "Agreement". The General Conditions shall apply to all Work of this Section.

B. Work specified herein shall be the removal and disposal of Asbestos-Containing Materials (ACM) and asbestos-contaminated materials from designated areas of the Staten Island Animal Care Center, located at 3139 Veterans Road West, Staten Island, New York, 10309.

C. The following documents were reviewed and utilized to generate this abatement design specification which serves to locate and quantify the amount of ACM, and asbestos contaminated material, to be abated in support of this project.

1. Set of drawings titled "Staten Island Animal Care Center" (75% Construction Documents), dated 10/08/10, prepared by Garrison Architects;
2. Asbestos Survey Report performed by LBA dated 09/27/11.

Note: Destructive sampling was not performed during the asbestos inspection for the full demolition project, therefore if suspect material is uncovered during the construction work shall stop and await the Authority's directive.

D. The phasing and scheduling of work for this project shall be coordinated with and approved by the Construction Project Manager and Facility Manager. The Construction Project Manager and Facility Manager will make the final determination on all issues under this Contract covered by this Specification.

1.02 SCOPE OF WORK

A. The asbestos abatement contractor is to provide all labor, materials, equipment, services, testing, appurtenances, permits and agreements necessary to perform the work required for the abatement of ACM as required by these contract documents. All work shall be performed in accordance with this Specification, EPA regulations, OSHA regulations, New York City Local Law 70, Title 15, Chapter 1 RCNY, New York State Industrial Code 56, NIOSH recommendations, and any other applicable federal, state or local government regulations. Whenever there is a conflict or overlap of the above references, the most stringent provisions are applicable.

B. The intent of this Specification section is to ensure that the asbestos abatement contractor is responsible for the following:

1. Abatement of all ACM.

2. Cleaning and decontamination of the entire affected area.

3. Demolition that may be required to access ACM in each area, Asbestos abatement contractor shall dispose of all debris associated with demolition activities as ACM waste.

4. Removal and disposal of all ACM found within these areas such as duct vibration cloth, roof membrane, roof flashing material, etc.

5. Provide all scaffolding, platform installation, equipment, tools, transportation and any other equipment required and/or necessary to complete all work described in the Contract Documents.

6. The Asbestos abatement contractor shall be responsible for and shall include any and all fees or changes imposed by Local, State or Federal Law, Rule or Regulation applicable to the work specified herein, including fees or charges which may be imposed subsequent to the work.

7. Prior to destructive demolition activities, the DDC may elect to collect bulk samples of assumed asbestos-containing materials and analyze the bulk samples for asbestos content.

C. The Asbestos abatement contractor shall perform the following work as described below and indicated on the drawings. The drawings are only a diagrammatic representation of the Work Areas and do not constitute the actual quantities of material. Asbestos abatement contractor is responsible for the confirmation of the actual total quantities of the Work.

1. Drawing H002.00: First Floor Plan

a. Remove and dispose of asbestos containing caulking between asphalt & sidewalk, black in **Work Area 1** utilizing NYC-DEP Title 15, Chapter 1, § 1-106 Tent Procedures.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
1	NYC DEP Section § 1-106 Tent Procedures	21 Sq. Ft. (250 Ln. Ft.) of Caulking Between Asphalt & Sidewalk, Black	–

2. Drawing H003.00: Roof Plan

a. Remove and dispose of asbestos-containing tar on vents within **Work Area 2.** Asbestos-containing tar on vents shall be removed utilizing NYCDEP Title 15, Chapter 1 § 1-107 Foam Procedure for Roof Removal. The Contractor shall be responsible for the removal and disposal of all roofing components, including but not limited to tar on vents down to the substrate/deck.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
2	NYC DEP Section § 1-107 Foam Procedure for Roof Removal	40 Sq. Ft. of Tar on Vents	–

D. The facility is under the jurisdiction of the Animal Care and Control of New York. The asbestos abatement contractor shall perform the work of this contract in a manner that will be least disruptive to the normal use of the building.

E. Asbestos abatement contractor's attention is directed to the fact that patents cover certain methods of asbestos abatement indicated in the specifications. To date, patents have been issued with regard to negative pressure enclosures or negative or reduced pressure and glove-bag.

F. Asbestos abatement contractor shall be solely responsible for and shall hold the City of New York Department of Design and Construction and the City harmless from, any and all damages, losses and expenses resulting from any infringement by Asbestos abatement contractor of any patent, including but not limited to the patents described above, used by Asbestos abatement contractor during performance of this agreement.

G. Prior to starting, the asbestos abatement contractor must notify the Commissioner of the City of New York Department of Design and Construction if he anticipates any difficulty in performing the work as directed and required by these Specifications. Asbestos abatement contractor shall be required to attend an on-site job meeting with the Construction Project Manager prior to start of work to examine conditions of the site for removal and plan the sequence for removal operations.

H. The asbestos abatement contractor shall retain a certified Project Designer for the preparation of an Asbestos Variance Application (ACP-9), if required.

I. The asbestos abatement contractor shall be responsible for preparing and submitting all filings, notifications, amendments and variances, etc. required by all City, State and Federal regulatory agencies having jurisdiction, at no additional cost to the NYC DDC.

J. The asbestos abatement contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York) to prepare a Work Place Safety Plan (WPSP), if required.

K. The asbestos abatement contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York) to perform final inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required under Chapter 17 of the Building Code. Such special inspections and A-TR1 forms shall be completed by the Registered Design professional.

L. For coordination with other Asbestos abatement contractors, see the General Conditions governing all Contracts.

M. Related Asbestos Removal Work Under Other Contracts:

1. Each asbestos abatement contractor shall be responsible for the removal of incidental asbestos not identified in this section and found prior to or during the Work.

2. Incidental asbestos is defined as ACM that is discovered during the course of their work that must be abated to enable them to perform the work of their Contract.

N. Work Hours:

1. The asbestos abatement contractor shall establish his work schedule in a way that avoids interference or conflict with the normal functioning of the facility. Work in the evenings shall be done at no additional cost to the City.

2. All work shall be done during regular working hours unless the Asbestos abatement contractor requests authorization to work other than regular working hours and such authorization is granted by the Commissioner (Regular working hours are those during which any given facility in which work is to be done is customarily open and functioning). If such work schedule is authorized by the Commissioner the work shall be done at no additional cost to the City.

3. The order of phases and start dates associated with each will be determined by the Construction Project Manager.

4. Asbestos abatement contractor shall be required to schedule waste transfer during evening hours, when activity within the facility is at a minimum. Evening hours are defined as 6:00 p.m. to 6:00 a.m. Waste transfer must be approved by the Construction Project Manager and Facility Manager.

O. The following conditions shall apply to all temporary shutdowns of existing services:

1. All temporary lighting and temporary electrical services for use in the Work Area shall be in weather proof enclosures and be ground fault protected and:

2. Shall be performed at no additional charge to the City.

3. Shall be performed at times not interfering with the other activities in the building.

4. Shall be performed only with written consent from the Commissioner and the Facility Manager.

5. Shall be made through written request to the Commissioner at least 10 days in advance with complete written description of the work to be performed.

P. Stages of Asbestos Removal Work:

a. The asbestos abatement contractor will be required to perform the work and it is the intent of this Specification to remove all asbestos containing and asbestos contaminated materials from the Work Area. The asbestos abatement contractor is responsible for verifying all quantities of materials listed.

Q. Certain equipment in the Work Area may need to remain operational during removal. Therefore, the removal of ACM from this equipment shall be performed as the last removal activities within the Work Area. The Asbestos abatement contractor shall coordinate the scheduling for the removal of ACM on functioning equipment with the Construction Project Manager.

1.03 QUALIFICATIONS OF ASBESTOS ABATEMENT CONTRACTOR

A. Requirements: The asbestos abatement contractor must demonstrate compliance with the special experience requirements set forth in subparagraphs (1) through (5) below. The asbestos abatement contractor must submit documentation demonstrating compliance with all listed requirements. Such documentation shall include without limitation, all required licenses, certificates, and documentation.

1. The asbestos abatement contractor must, whether an individual, corporation, partnership, joint venture or other legal entity, demonstrate for the three year period prior to the work, that it has been licensed by the New York State Department of Labor, as an "Asbestos Abatement Contractor".

2. The asbestos abatement contractor must, for the three year period prior to the work, have been in the business of providing asbestos abatement services as a routine part of its daily operations.

3. The asbestos abatement contractor proposing to do asbestos abatement work must be thoroughly experienced in such work and must provide evidence of having successfully performed and completed in a timely fashion at least five (5) asbestos abatement projects of similar size and complexity. The aggregate cost of these projects must be at least $1,000,000 in each of the three years.

4. For each project submitted to meet the experience requirements set forth above, the asbestos abatement contractor must submit the following information for the project; name and location of the project; name title and telephone number of the owner or the owner's representative who is familiar with the asbestos abatement contractor's work; brief description of the work completed as a prime or sub-asbestos abatement contractor; amount of contract or subcontract and the date of completion.

5. The asbestos abatement contractor must demonstrate that it has the financial resources, supervisory personnel and equipment necessary to carry out the work and to comply with the required performance schedule, taking into consideration other business commitments. The asbestos abatement contractor must submit such documentation as may be required by the Department of Design and Construction to demonstrate that it has the requisite capacity to perform the required services of this contract.

B. Throughout the specifications, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics thereof. Provide materials or workmanship that meet or exceed the specifically named codes or standards where required by these specifications.

C. Site Investigation: Asbestos abatement contractor shall inspect all the specifications and related drawings, and will investigate and confirm the site conditions affecting the work, including, but not limited to:

1. Physical considerations and conditions of both the material and structure. These considerations include any obstacles or obstructions encountered in accessing or removing the material.

2. Handling, storage, transportation and disposal of the material.

3. Availability of qualified and skilled labor.

4. Availability of utilities.

5. Exact quantities of all materials to be disturbed and/or removed.

1.04 WORK BY OTHERS

The City reserves the right during the term of this Contract to have work performed on asbestos abatement projects by other asbestos abatement contractors as the situation warrants.

1.05 DEFINITIONS

A. General Explanation: Certain terms used in this Specification Section are defined below. Definitions and explanations of this Specification Section are not necessarily complete or exclusive, but are general for the Work to the extent they are not stated more explicitly in another element of the Contract Documents.

B. Definitions in General Use:

1. Approve: Where used in conjunction with Engineer's response to submittals, requests, applications, inquiries, reports and claims by Asbestos abatement contractor, the meaning of term "approved" will be held to limitations of Engineer's responsibilities and duties as specified in Contract Documents. In no case will "approval" by Engineer be interpreted as a release of Asbestos abatement contractor from responsibilities to fulfill requirements of Contract Documents.

2. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Engineer," "requested by Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend Engineer's responsibility into Asbestos abatement contractor's responsibility for construction supervision.

3. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

4. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for

purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

5. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at Project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

6. Installer: The term "installer" is defined as the entity (person or firm) engaged by the asbestos abatement contractor, or its sub-asbestos abatement contractor for performance of a particular unit of work at Project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (installers) be expert in operations they are engaged to perform.

7. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

8. Third-Party Air Monitor: The term "Third-Party Air Monitor " is defined as an entity engaged by City and Construction Project Manager to perform specific inspections or tests of the work, either at Project site or elsewhere; and to report and (if required) interpret results of those inspections or tests.

C. Definitions Relative to Asbestos Abatement:

1. Abatement: Any and all procedures physically taken to control fiber release from asbestos-containing materials. This includes removal, encapsulation, enclosure, cleanup and repair.

2. Adequately Wet: The complete penetration of a material with amended water to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then the material has not been adequately wetted. However, the absence of visible emissions is not evidence of being adequately wet. ACM must be fully penetrated with the wetting agent in order to be considered adequately wet. If the ACM being abated is resistant to amended water penetration, wetting agent shall be applied to the material prior to and during removal as necessary to minimize fiber release.

3. Aggressive Sampling: Method of sampling in which the individual collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.

4. AHERA: Asbestos Hazard Emergency Response Act of 1986

5. AIHA: American Industrial Hygiene Association.

6. Airlock: System for permitting entrance and exit while restricting air movement between a contaminated area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

7. Air Sampling: Process of measuring the fiber content of a known volume of air collected during a specific period. The procedure utilized for asbestos follows the NIOSH Standard Analytical Method 7400, or the provisional transmission electron microscopy methods developed by the US EPA which is utilized for lower detection levels and specific fiber identification.

8. Ambient Air Monitoring: "Ambient air monitoring" shall mean measurement or determination of airborne asbestos fiber concentrations outside but in the general vicinity of the worksite.

9. Amended Water: Water to which a surfactant has been added.

10. ANSI: American National Standards Institute

11. Area Air Sampling: Any form of air sampling or monitoring where the sampling device is placed at some stationary location.

12. Asbestos: Any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumingtonite-grunerite), crocidolite (riebeckite), tremolite, anthophyllite and actinolite.

13. Asbestos-Containing Material (ACM): Asbestos or any material containing more than one-percent asbestos.

14. Asbestos-Containing Waste Material: ACM, asbestos-contaminated objects or debris associated with asbestos abatement requiring disposal.

15. Asbestos-Contaminated Objects: Any objects which have been contaminated by asbestos or asbestos-containing material.

16. Asbestos Assessment Report: "Asbestos Assessment Report" shall mean the "Form ACP-5" form, as approved by NYCDEP, by which a NYCDEP-certified asbestos investigator certifies that a building or structure (or portion thereof) is free of ACM or the amount of ACM to be abated constitutes a minor project.

17. Asbestos Handler: Individual who disturbs, removes, repairs, or encloses asbestos material. This individual shall have completed approved training course(s) and be in possession of certification issued by NYCDEP and NYSDOL.

18. Asbestos Handler Supervisor: Individual who supervises the handlers during an asbestos project and ensures that proper asbestos abatement procedures as well as individual safety procedures are being adhered to. This individual shall have completed approved training course(s) and be in possession of certification issued by NYCDEP and NYSDOL.

19. Asbestos Investigator: An individual certified by NYCDEP as having successfully demonstrated his or her ability to identify the presence of and evaluate the condition of asbestos in a building or structure.

20. Asbestos Project: Any form of work performed in a building or structure which will disturb (e.g., remove, enclose, encapsulate) more than 25 linear feet or more than 10 square feet of asbestos-containing material.

21. ASTM: American Society for Testing and Materials.

22. Asbestos Project Notification: The "Form ACP-7" asbestos project notification form as approved by DEP.

23. Authorized Visitor: Authorized visitor shall mean the building owner and his/her representative, and any representative of a regulatory or other agency having jurisdiction over the project.

24. Building Owner: Person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance Building Owner means the person in whom beneficial title is vested.

25. Building Materials: Any and all manmade materials, including but not limited to interior and exterior finishes, equipment, bricks, mortar, concrete, plaster, roofing, flooring, caulking, sealants, tiles, insulation, and outdoor paving such as sidewalks, paving tiles and asphalt.

26. Certified Industrial Hygienist (CIH): Individual with a minimum of five years experience as an industrial hygienist and who has successfully completed both levels of the examination administered by the American Board of Industrial Hygiene and who is currently certified by that board.

27. Certified Safety Professional (CSP): Individual having a bachelor's degree from an accredited college or university and a minimum of four years experience as a safety professional and who has successfully completed both

levels of the examination administered by the Board of Certified Safety Professionals and who is currently certified by that board.

28. Chain of Custody: "Chain of Custody" shall mean the form or set of forms that document the collection and transfer of a sample.

29. City: City of New York

30. Clean Room: An uncontaminated area or room that is part of worker decontamination enclosure system with provisions for storage of workers' street clothes and protective equipment.

31. Clearance Air Monitoring: Employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers and shall be performed as the final abatement activity.

32. Commissioner: shall mean the head of the Agency that has entered into this contract or his/her duly authorized representative.

33. Competent Person: Shall mean the designated person as defined by OSHA in 29 CFR1926.1101.

34. Curtained Doorway: Device that consists of at least three overlapping sheets of fire retardant plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to ensure that the sheets hang straight and maintain a seal over the doorway when not in use.

35. Decontamination Enclosure System: Series of connected rooms, separated from the Work Area and from each other by air locks, for the decontamination of workers, materials, waste containers, and equipment.

36. Demolition: The dismantling or razing of a building, including all operations incidental thereto (except for asbestos abatement activities), for which a demolition permit from the New York City Department of Buildings is required.

37. NYCDEP or DEP: The New York City Department of Environmental Protection.

38. Disturb: Any action taken which may alter, change, or stir, such as but not limited to the removal, encapsulation, enclosure or repair of asbestos-containing material.

39. DOB: The New York City Department of Buildings.

40. Egress: A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.

41. ELAP: Environmental Laboratory Approval Program administered by the New York State Department of Health.

42. Encapsulant (sealant) or Encapsulating Agent: Liquid material which can be applied to ACM and which temporarily controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

43. Encapsulation: The coating or spraying of asbestos-containing material encapsulant. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

44. Enclosure: Construction of airtight walls and/or ceilings between ACM and the facility environment, or around surfaces coated with ACM, or any other appropriate procedure as determined by the NYCDEP which prevents the release of asbestos fibers.

45. EPA or USEPA: United States Environmental Protection Agency.

46. Equipment Room: Contaminated area or room that is part of the worker decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

47. Exit: That portion of a means of egress system which is separated from other interior spaces of a building or structure by fire-resistance-rated construction to provide a protected path of egress travel between the exit access and the exit discharge.

48. FDNY: The Fire Department of the City of New York.

49. Fiber: An acicular single crystal or a similarity elongated polycrystalline aggregate which displays some resemblance to organic fibers by having such properties as flexibility, high aspect ratio, silky luster, axial lineation, and others, and which has attained its shape primarily through growth rather than cleavage.

50. Fixed Object: A unit of equipment, furniture, or other item in the work area which cannot be removed from the work area. Fixed objects shall include equipment, furniture, or other items that are attached, in whole or in part, to a floor, ceiling, wall, or other building structure or system or to another fixed object and cannot be reasonably removed from the work area. Fixed objects shall also include pipes and other equipment inside the work area which are not the subject of the asbestos project. Active fire suppression system components shall not be considered fixed objects.

51. Glovebag technique: shall mean a method for removing asbestos-containing material from heating, ventilation and air conditioning (HVAC) ducts, short piping runs, valves, joints, elbows, and other nonplanar surfaces. The glovebag assembly is a manufactured device consisting of a large bag (constructed of at least 6-mil transparent plastic), two inward-projecting long sleeve gloves, one inward-projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process.

52. HEPA-Filter: High efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles (asbestos fibers) greater than 0.3 micrometers mass median aerodynamic equivalent diameter.

53. HEPA vacuum equipment: "HEPA vacuum equipment" shall mean vacuuming equipment with a HEPA filter.

54. Holding Area: Chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area.

55. Homogeneous Work Area: Portion of the Work Area that contains one type of ACM and/or where one type of abatement is used.

56. Industrial Hygiene: Science and art devoted to the recognition, evaluation, and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among worker or among the citizens of the community.

57. Industrial Hygienist: Individual having a college or university degree or degrees in Engineering, Chemistry, Physics or Medicine, or related Biological Sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the above cognate sciences to provide the abilities:

    a. To recognize the environmental factors and to understand their effect on people and their well being; and

    b. To evaluate, on the basis of experience and with the aid of quantitative measurement techniques, the magnitude of these stresses in terms of ability to impair people's health and well being; and

    c. To prescribe methods to eliminate, control, or reduce such stresses when necessary to alleviate their efforts.

58. Isolation Barrier: The construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the work place from surrounding areas and to contain asbestos fibers in the work area.

59. Large Asbestos Project: Asbestos project involving the disturbances (e.g., removal, enclosure, encapsulation) of 260 linear feet or more of ACM or 160 square feet or more of ACM.

60. Log: An official record of all activities that occurred during the project. At a minimum, the log shall identify the building owner, agent, asbestos abatement contractor, and workers, and other pertinent information including daily activities, cleanings and waste transfers, names and certificate numbers of asbestos handler supervisors and asbestos handlers; results of inspections of decontamination systems, barriers, and negative pressure ventilation equipment; summary of corrective actions and repairs; work stoppages with reason for stoppage; manometer readings at least twice per work shift; daily checks of emergency and fire exits and any unusual events.

61. Minor Project: A project involving the disturbance (e.g., removal, enclosure, encapsulation, repair) of 25 linear feet or less of asbestos containing material or 10 square feet or less of asbestos containing material.

62. Movable Object: Unit of equipment or furniture in the Work Area that can be removed from the Work Area.

63. Negative Air Pressure Equipment: Portable local exhaust system equipped with HEPA filtration. The system shall be capable of creating a negative pressure differential between the outside and inside of the Work Area.

64. NESHAPS: National Emission Standards for Hazardous Air Pollutants.

65. NFPA: The National Fire Protection Association.

66. NIOSH: National Institute for Occupational Safety and Health.

67. DEP or NYCDEP: New York City Department of Environmental Protection

68. NYSDOL: New York State Department of Labor.

69. NYSDOL ICR 56: "NYSDOL ICR 56" shall mean Part 56 of the Official Compilation of Codes, Rules and Regulations of the State of New York or 12 NYCRR Part 56.

70. NYSDOH: The New York State Department of Health.

71. Obstruction: The blocking of a means of egress with any temporary structure or barrier. A double layer of fire-retardant 6-mil polyethylene sheeting shall not be considered an obstruction when it is prominently marked as an exit with photo luminescent signage or paint and cutting tools (knife, razor) are attached to the work area side of the sheeting for use in the event that the sheeting must be cut to permit egress. A corridor shall not be considered obstructed when there is a clear path measuring at least three (3) feet wide.

72. Occupied Area: Area of the work site where abatement is not taking place and where personnel or occupants normally function or where workers are not required to use personal protective equipment.

73. OSHA: Occupational Safety and Health Administration.

74. Outside air: "Outside air" shall mean the air outside the work place.

75. Person: Individual, partnership, company, corporation, association, firm, organization, governmental agency, administration, or department, or any other group of individuals, or any officer or employee thereof.

76. Personal Air Monitoring: Method used to determine employees' exposure to airborne asbestos fibers. The sample is collected outside the respirator in the worker's breathing zone.

77. Personal Protective Equipment (PPE): Appropriate protective clothing, gloves, eye protection, footwear, and head gear.

78. Phase Contrast Microscopy (PCM): The measurement protocol for the assessment of the fiber content of air. (NIOSH Method 7400).

79. Physician: Person licensed or otherwise authorized under Article 131 Section 65.22 of the New York State Education Law.

80. Plasticize: To cover floors and walls with fire retardant plastic sheeting as herein specified or by using spray plastics as acceptable to the Department.

81. Polarized Light Microscopy (PLM): The measurement protocol for the assessment of the asbestos content of bulk materials. (Interim Method for the Determination of Asbestiform Materials in Bulk Insulation Samples- 40 CFR Part 763, Subpart F, Appendix A as amended on September 1, 1982)

82. Project Designer: A person who holds a valid Project Designer Certificate issued by the New York State Department of Labor.

83. Project Monitor: A person who holds a valid Project Monitor Certificate issued by the New York State Department of Labor.

84. Qualitative Fit Test: Individual test subject's responding (either voluntarily or involuntarily) to a chemical challenge outside the respirator face-piece. Acceptable methods include irritant smoke test, odorous vapor test, and taste test.

85. Quantitative Fit Test: Exposing the respiratory wearer to a test atmosphere containing an easily detectable, nontoxic aerosol, vapor or gas as the test agent. Instrumentation, which samples the test atmosphere and the air inside the face-piece of the respirator, is used to measure quantitatively the leakage into the respirator. There are a number of test atmospheres, test agents, and exercises to perform during the test.

86. Registered Design Professional: A person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York.

87. Removal: Stripping of any asbestos- containing materials from surfaces or components of a facility or taking out structural components in accordance with 40 CFR 61 Subparts A and M.

88. Renovation: An addition or alteration or change or modification of a building or the service equipment thereof, that is not classified as an ordinary repair as defined in §27-125 of the Administrative Code of the City of New York.

89. Repair: Corrective action using specified work practices (e.g., glovebag, plastic tent procedures, etc.) to minimize the likelihood of fiber release from minimally damaged areas of ACM.

90. Replacement material: Any material used to replace ACM that contains less than .01 percent asbestos.

91. Shift: A worker's, or simultaneous group of workers', complete daily term of work.

92. Shower Room: Room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold running water controllable at the tap and arranged for complete showering during decontamination.

93. Small Asbestos Project: Asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of more than 25 and less than 260 linear feet of ACM or more than ten and less than 160 square feet of ACM.

94. Staging Area: Work Area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the Work Area.

95. Strip: To remove asbestos materials from any part of the facility.

96. Structural Member: Load-supporting member of a facility, such as beams and load-supporting walls, or any non-load-supporting member, such as ceiling and non-load-supporting walls.

97. Surface barriers: The plasticizing of walls, floors, and fixed objects within the work area to prevent contamination from subsequent work.

98. Surfactant: Chemical wetting agent added to water to improve penetration.

99. Transmission Electron Microscopy (TEM): The measurement protocol for the assessment of the asbestos fiber content of air. Interim Transmission Electron Microscopy Analytical Methods-40 CFR Part 763, Subpart E, Appendix A.

100. Visible Emissions: Emissions containing particulate material that are visually detectable without the aid of instruments.

101. Washroom: Room between the Work Area and the holding area in the equipment decontamination enclosure system where equipment and waste containers are wet cleaned and/or HEPA-vacuumed prior to disposal.

102. Waste decontamination enclosure system: "Waste decontamination enclosure system" shall mean the decontamination enclosure system designated for the controlled transfer of materials and equipment, consisting of a washroom and a holding area.

103. Wet Cleaning: "Wet cleaning" shall mean the removal of asbestos fibers from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.

104. Wet methods: "Wet methods" shall mean the use of amended water or removal encapsulants to minimize the generation of fibers during ACM disturbance.

105. Work Area: Designated rooms, spaces, or areas of the building or structure where asbestos abatement activities take(s) place.

106. Worker Decontamination Enclosure System: Portion of a decontamination enclosure system designed for controlled passage of workers and authorized visitors, consisting of a clean room, a shower room, and an equipment room separated from each other and from the Work Area by airlocks and curtained doorways.

107. Work Place: The work area and the decontamination enclosure system(s).

108. Work Place Safety Plan: Construction documents prepared by a registered design professional and submitted for review by DEP in order to obtain an asbestos abatement permit. Such plan shall include, but not be limited to, plans, sections, and details of the work area clearly showing the extent, sequence, and means and methods by which the work is to be performed.

109. Work Site: Premises where abatement activity is being performed. May be composed of one or more Work Areas.

1.06 STANDARD OPERATING PROCEDURES

A. Develop and implement a written standard procedure for abatement work to ensure maximum protection and safeguard from asbestos exposure of the workers, visitors, employees, public, and environment.

B. TELEPHONE PAGING DEVICE

The asbestos abatement contractor or his authorized representative shall, at all times during the normal workday or during periods of overtime work under this Contract, carry a digital telephone paging device ("Beeper") and/or cellular telephones which can be activated by a telephone number in the 212 or 646 or 718 or 917 or 929 area code. He shall supply the Department of Design and Construction with the activation number for the device and he is liable to respond back to the calls from DDC within the next one (1) hour period after he receives calls from DDC. The cost to the asbestos abatement contractor for this device and all charges accruing thereto is deemed included in the work.

C. The standard operating procedure shall ensure:

1. Tight security from unauthorized entry into the workspace.

2. Restriction of asbestos abatement contractor's personnel to the immediate Work Area and access/egress routes.

3. Donning of proper protective clothing and respiratory protection prior to entering the Work Area.

4. Safe work practices in the work place, including provisions for inter-room communications, exclusion of eating, drinking, smoking, or in any way breaking the respiratory protection.

5. Proper exit practices from the work space to the outside through the showering and decontamination facilities.

6. Removing asbestos in a way that minimizes release of fibers.

7. Packing, labeling, loading, transporting, and disposing of contaminated material in a way that minimizes exposure and contamination.

8. Emergency evacuation procedures, for medical or safety situations, to minimize the potential exposure to airborne asbestos fibers for emergency personnel, building occupants, and building environment.

9. Safety from accidents in the workspace, especially from electrical shocks, fall hazards associated with scaffolding, slippery surfaces, and entanglements in loose hoses and equipment.

10. Provisions for effective supervision, air monitoring and personnel monitoring for exposure during the work.

11. Engineering controls that minimize exposure to fibers within the workspace.

12. The asbestos abatement contractor shall provide a 24-hour fire watch throughout the entire term of the project, to protect against fire and unauthorized entry into the workspace. Fire watch shall be performed by an individual who is a certified asbestos worker capable of entering the Work Area for regular inspections.

D. Provide an Asbestos Handler Supervisor to provide continuous supervision of all work, and to be responsible for the following:

1. Ensure that individuals are using proper personal protective equipment, are trained in its use and hold valid NYCDEP and NYSDOL Asbestos Handler certificates

2. Maintain entry log records and ensure that they are recorded in accordance with the provisions of Title 15, Chapter 1 of RCNY and NYSDOL ICR 56.

3. Surveillance of the Work Areas at a minimum of once per work shift or as required by Title 15, Chapter 1 of RCNY and NYSDOL ICR 56 -7.3, to ensure the integrity of work place isolation, negative pressure equipment and workers personal protective equipment is not torn or ripped and that respiratory protection is worn at all times.

4. Ensure that sufficient personal protective equipment is stored in the clean room.

5. Take precautions to prevent heat stress. Precautions include, but are not limited to, selecting lightweight protective clothing, reducing the work rate, and providing adequate fluid breaks.

6. Perform work area inspection with project monitor prior to the commencement of final clearance air monitoring.

7. The asbestos abatement contractor shall retain the asbestos handler supervisor to perform a visual inspection prior to the post-abatement clearance air monitoring to confirm that all containerized waste has been removed from work and holding areas and there is no visible ACM debris or residue on or about all abated surfaces.

E. ENGINEERING CONTROLS

1. The 8-hour time weighted average airborne concentration of fibers to which any passerby may be exposed shall not exceed 0.01 fibers per cubic centimeter of air when fibers have a physical dimension longer than 5 micrometers as determined by the method prescribed in these Specifications.

2. All asbestos projects shall utilize negative pressure ventilation equipment.

   a. The asbestos abatement contractor shall use a manometer to document the pressure differential. The asbestos abatement contractor shall install and make the manometer operational once the negative pressure has been established in the work area. Magnahelic manometers shall be calibrated at least every six months and a copy of the current calibration certification shall be available at the work site.

3. Negative pressure ventilation equipment shall be installed and operated to provide at least one air change in the work area every 15 minutes. Where there are no floor or wall barriers because floor or wall material is being abated, there shall be at least one air change in the work area every ten minutes.

4. The negative pressure ventilation equipment shall operate continuously, 24 hours a day, from the establishment of isolation barriers through successful clearance air monitoring. If such equipment shuts off, adjacent areas shall be monitored for asbestos fibers.

5. A static negative air pressure of 0.02 inches (minimum) water column shall be maintained at all times in the work place during abatement to ensure that contaminated air in the Work Area does not filter back to uncontaminated areas.

6. If the contaminated area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell, or at a secured location in the ground floor lobby when conditions warrant. The required switch or switches shall be installed by a licensed electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation equipment is used on multiple floors, the cut off switch shall be able to turn off the equipment on all floors.

7. On loss of negative pressure or electric power to the negative pressure ventilating units, abatement shall stop immediately and shall not resume until power is restored and negative pressure ventilation equipment is operating again.

8. Negative pressure ventilation equipment shall be exhausted to the outside of the building away from occupied areas.

    a. All openings (including but not limited to operable windows, doors, vents, air intakes or exhausts of any mechanical devices) less than 15 feet from the exterior exhaust duct termination location shall be plasticized with two layers of fire retardant 6-mil polyethylene sheeting, or a second negative pressure ventilation unit with the primary unit's capacity shall be connected in series prior to exhausting to the outside.

    b. Negative pressure ventilation equipment shall exhaust away from areas accessible to the public.

    c. All ducting shall be sealed and braced or supported to maintain airtight joints. Ducts shall be reinforced and shall be installed so as to prevent breakage. Damage to ducts must be repaired immediately.

9. Where ducting to the outside is not possible, a second negative pressure ventilation unit compatible with the primary unit's capacity shall be connected in series. The area receiving the exhaust shall have sufficient, non-recycling exhaust capacity to the outside of the structure.

10. In the event that there is a failure of the containment system or a breach in the Isolation Barriers, all abatement work will cease and the asbestos abatement contractor will immediately correct the condition. Abatement work will not resume until the Work Area has been smoke tested by the third party laboratory and approved by the Construction Project Manager.

F. LOCKDOWN ENCAPSULATION PROCEDURES

1. The following procedures shall be followed to seal in non-visible residue while conducting lockdown encapsulation on all surfaces from which ACM has not been removed:

   a. Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA Contract shall be used for lockdown encapsulation.

   b. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon unless reviewed and approved by DEP.

   c. Latex paint with solids content greater than 15 percent shall be considered a lockdown sealant for coating all non-metallic surfaces.

   d. Encapsulants shall be applied using airless spray equipment. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.

   e. The cleaned layer of the surface barriers shall be removed from walls and floors.

   The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

1.07 NOTIFICATIONS, PERMITS, WARNING SIGNS, LABELS, AND POSTERS

A. The asbestos abatement contractor shall submit an Asbestos Project Notification (ACP-7) to the NYCDEP listing each work area within the building separately one week in advance of the start of work.

B. The asbestos abatement contractor shall obtain an asbestos abatement permit authorizing the performance of construction work as required for asbestos projects involving one or more of the following activities:

1. Obstruction of an exit door leading to an exit stair or the exterior of the building;

2. Obstruction of an exterior fire escape or access to that fire escape;

3. Obstruction of a fire-rated corridor leading to an exit door;

4. Removal of handrails in an exit stair or ramp;

5. Removal or dismantling of any fire alarm system component including any fire alarm-initiating device (e.g., smoke detectors, manual pull station);

6. Removal or dismantling of any exit sign or any component of the exit lighting system, including photo luminescent exit path markings;

7. Removal or dismantling of any part of a sprinkler system including piping or sprinkler heads;

8. Removal or dismantling of any part of a standpipe system including fire pumps or valves;

9. Removal of any non-load bearing / non-fire-rated wall (greater than 45 square feet or 50 percent of a given wall);

10. Any plumbing work other than the repair or replacement of plumbing fixtures;

11. Removal of any fire-resistance rated portions of a wall, ceiling, floor, door, corridor, partition, or structural element enclosure including spray-on fire resistance rated materials;

12. Removal of any fire damper, smoke damper, fire stopping material, fire blocking, or draft stopping within fire-resistance rated assemblies or within concealed spaces;

13. Any work that otherwise requires a permit from the DOB (full demolitions, alterations, renovations, modifications or plumbing work).

C. The asbestos abatement contractor shall provide a floor plan showing the areas of the building under abatement and the location of all fire exits in said areas. It shall be prominently posted in the building lobby or comparable location, along with a notice stating the location within the building of the negative air cutoff switch, if applicable.

D. The asbestos abatement contractor shall submit, as required, an asbestos abatement permit due to one or more of the activities listed in 1.07 (B) (1-8) and (B) (13) of this specification. The asbestos abatement asbestos abatement contractor is responsible for submitting, with an asbestos project notification, a work place safety plan (WPSP) and any other applicable construction documents. These documents must be prepared by a registered design professional.

E. A WPSP is not required for projects requiring an asbestos abatement permit due to one or more of the activities listed in 1.07 (B) (9-12) of this specification. The asbestos abatement contractor shall submit, together with the asbestos project notification, all applicable asbestos abatement permit construction documents.

F. The asbestos abatement contractor shall retain a Registered Design Professional to perform the inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required by Chapter 17 of the Building Code, as follows:

1. A final inspection shall be performed by a registered design professional retained by the asbestos abatement contractor after all work authorized by the asbestos abatement permit is completed. The person performing the inspection shall note all failures to comply with the provisions of the Building Code or approved asbestos abatement permit and shall promptly notify the owner in writing. All defects noted in such inspection shall be corrected. The final inspection report shall either:

   a. Confirm:

      (1) That the construction work is complete, including the reinstallation or reactivation of any building fire safety or life safety component.

      (2) That any defects previously noted have been corrected.

      (3) That all required inspections were performed.

      (4) That the work is in substantial compliance with the approved asbestos abatement permit construction documents, the Building Code, and other applicable laws and rules.

   b. Confirm:

(1) That the construction work does not return the building (or portion thereof) affected by the abatement project to a condition compliant with the building code and other applicable laws and rules, but that the registered design professional has reviewed an application for asbestos abatement permit construction documents approval that has been approved by the department of buildings, and the subsequent scope of work as approved will, upon completion, render all areas affected by the asbestos project in full compliance with the building code and all applicable laws and rules.

(2) That any defects previously noted that are not addressed by the subsequent scope of work as approved by the department of buildings, have been corrected.

(3) That all required inspections that are not addressed by the subsequent scope of work as approved by the department of buildings were performed.

(4) That all completed work pursuant to an asbestos abatement permit is in substantial compliance with the approved asbestos abatement permit construction documents.

G. The asbestos abatement contractor shall provide the final inspection reports to be filed with DEP on A-TR1 form. Records of final inspections made by registered design professionals shall be submitted to DDC as part of the close out document package.

H. Erect bilingual (English-Spanish) warning signs around the work space and at every point of potential entry from the outside and at main entrance to building which can be viewed by the public without obstruction, in accordance with OSHA 29 CFR 1926.1101 (K) (Sign Specifications) and Title 15, Chapter 1 of RCNY. The warning signs shall be a bright color so that they will be easily noticeable. The size of the sign and the size of the lettering shall be no less than OSHA requirements.

I. Provide the required labels for all polyethylene bags and all drums utilized to transport contaminated material to the landfill in accordance with OSHA 29 CFR 1926.1101 (K)(2) and by 49 CFR Parts 171 and 172 of the Department of Transportation regulations.

J. Provide any other signs, labels, warnings, and posted instructions that are necessary to protect, inform and warn people of the hazard from asbestos exposure. Post in a prominent and convenient place for the workers a copy of the latest applicable regulations from OSHA, EPA, NIOSH, State of New York and

New York City and any additional items mandated for posting by the aforementioned regulations.

K. Furnish all permits, variances and notices required to perform the Work.

1.08 EMERGENCY PRECAUTIONS

A. Establish emergency and fire exits from the Work Area. The clean side of all emergency exits shall be equipped with two full sets of protective clothing and respirators at all times.

B. Notify local medical emergency personnel, both ambulance crews and hospital emergency room staff prior to commencement of abatement operations as to the possibility of having to handle contaminated or injured workmen, and shall be advised on safe decontamination.

C. Prepare to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated immediately for decontamination. When an injury occurs, precautions shall be taken to reduce airborne fiber concentrations (i.e., misting of the air with water) until the injured person has been removed from the Work Area.

D. Notify, before actual removal of the asbestos material, the local police and fire departments to the danger of entering the Work Area. Asbestos abatement contractor shall make every effort to help these agencies form plans of action should their personnel need to enter the contaminated area.

1.09 SUBMITTALS

A. Pre-Construction Submittals:

1. Attend a pre-construction meeting scheduled by the City of New York Department of Design and Construction. This meeting shall also be attended by a designated representative of the City of New York third party air monitoring firm, facility manager and the Construction Project Manager. At this meeting, the asbestos abatement contractor shall present three copies of the following items, bound and indexed. The detailed plan of action must be submitted at least five (5) days prior to the pre-construction meeting.

   a. Asbestos abatement contractor's scope of work, work plan and schedule.

   b. Asbestos project notifications, approved variances and plans to Government Agencies.

   c. Copies of Permits, clearance and licenses if required.

d. Schedules: the asbestos abatement contractor shall provide to the Construction Project Manager a copy of the following schedules for approval. Once approved, schedules shall be maintained and updated as received. Asbestos abatement contractor shall post a copy of all schedules at the site:

(1) A construction schedule stating critical dates of the project including, but not limited to, mobilization, Work Area preparation, demolition, gross removal, fine cleaning, encapsulation, inspections, clearance monitoring, and phase of refinishing and final inspections. The schedule shall be updated biweekly, at a minimum.

(2) A schedule of staffing stating number of workers per shift per activity, name and number of supervisor(s) per shift, shifts per day, and total days to be worked.

(3) Submit all changes in schedule or staffing to the Construction Project Manager prior to implementation.

(4) A schedule of equipment to be used including numbers and types of all major equipment such as HEPA Air Filtration Units, HEPA-vacuums, airless sprayers, Water Atomizing Devices and Type "C" compressors.

e. A written plan and shop drawings for preparation of work site and decontamination chamber.

f. Description of protective clothing and approved respirator to be used, make, model, NIOSH approval numbers.

g. Delineation of responsibility of work site supervision, including competent person, with names, resumes, and home telephone numbers.

h. Explanation of decontamination sequence and isolation techniques.

i. Description of specific equipment to be utilized, including make and model number of air filtration devices, vacuums, sprayers, etc.

j. Description of any prepared methods, procedures, techniques, or equipment other than those specified in the Contract Documents.

k. Explanation of the handling of asbestos contaminated wastes including EPA and NYCDEP identification numbers of Waste Hauler.

l. Description of the final clean-up procedures to be used.

m. Name and qualifications of asbestos abatement asbestos abatement contractor's Air Monitor including AIHA accreditation, and proof of NIOSH PAT and NIST/NVLAP Bulk Quality Assurance Proficiency of OSHA samples for approval by the City of New York Department of Design and Construction.

n. Written description of emergency procedures to be followed in case of injury or fire. This section must include evacuation procedures, source of medical assistance (name and telephone number) and procedures to be used for access by medical personnel (examples: first aid squad and physician). NOTE: Necessary Emergency Procedures Shall Take Priority Over All Other Requirements of These Specifications.

o. Material Safety Data Sheets (MSDS) for encapsulants, sealants, firestopping foam, cleaners/disinfectants, spray adhesive and any and all potentially hazardous materials that may be employed on the project. No work involving the aforementioned will be allowed to proceed until MSDS are reviewed.

p. Worker Training and Medical Surveillance: Asbestos abatement contractor shall submit a list of the persons who will be employed by him in the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.

q. Logs: Specimen copies of daily progress log, visitor's log, and disposal log.

(1) The asbestos abatement contractor shall provide a permanently bound log book of minimum 8-1/2" x 11" size at the entrance to the Worker and Waste Decontamination enclosure system as hereinafter specified. Log book shall contain on title page the project name, name, address and phone number of Environmental Control Representative; name, address and phone number of asbestos abatement contractor; name, address and phone number of asbestos abatement contractor and City's air testing entity; emergency numbers including, but not limited to local Fire/Rescue Department. Log book shall contain a list of personnel approved by the laboratory for entry into the Work Area.

(2) All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area.

Under no circumstances shall pencil entries be permitted. Any significant events occurring during the abatement project shall be entered into the log. Upon completion of the job, the Asbestos abatement contractor shall submit a copy of the logbook containing a day-to-day record of personnel log entries countersigned by the Construction Project Manager every day.

r. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of ACM, understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.

B. Submit copies of the following items to the Construction Project Manager during the work:

1. Security and safety logs showing names of person entering workspace, date and time of entry and exit, record of any accident, emergency evacuation, and any other safety and/or health incident.

2. Progress logs showing the number of workers, supervisors, hours of work and tasks completed shall be submitted daily to the Construction Project Manager.

3. Floor plans indicating asbestos abatement asbestos abatement contractor's current work progress shall be submitted for review by the Construction Project Manager at weekly progress meetings.

4. All asbestos abatement contractors' air monitoring and inspection results.

C. Project Closeout Submittals:

Upon completion of the project and as a condition of acceptance, the asbestos abatement contractor shall present two copies of the following items, bound and indexed:

1. Lien Waivers from asbestos abatement contractor, Sub-asbestos abatement contractors and Suppliers,

2. Daily OSHA air monitoring results,

3. All Waste Manifests (Asbestos and Construction Debris), seals and disposal logs,

4. Field Sign-In/Sign-Out Logs for every shift,

5. Copies of all Building Department Forms and Permits,

6. A Letter of Compliance stating that all the work on this project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations,

7. All Warranties as stated in the Specifications,

   a. Fully executed disposal certificates and transportation manifest.

8. Project Record: The asbestos abatement contractor shall maintain a project record for all small and large asbestos projects. During the project, the project record shall be kept on site at all times. Upon completion of the project, the project record shall be maintained by the building owner. The project record shall be submitted to DDC as part of the close out documents. The project record shall consist of:

   a. Copies of licenses of all asbestos abatement contractors involved in the project;

   b. Copies of DEP and NYSDOL supervisor and handler certificates for all workers engaged in the project;

   c. Copies of all project notifications and reports filed with DEP and NYSDOL for the project, with any amendments or variances;

   d. Copies of all asbestos abatement permits, including associated approved plans and work place safety plan;

   e. A copy of the air sampling log and all air sampling results;

   f. A copy of the abatement asbestos abatement contractor's daily log book;

   g. All data related to bulk sampling including the results of any asbestos surveys performed by an asbestos investigator;

   h. Copies of all asbestos waste manifests;

   i. A copy of all Project Monitor's Reports (ACP-15).

   j. A copy of each ATR-1 Form completed for the asbestos project (if required).

   k. A copy of each Asbestos Project Conditional Closeout Report (ACP-20).

   l. A copy of the Asbestos Project Completion Form (ACP-21).

9. The asbestos abatement contractor shall submit one of the following certifications to the DOB, with a copy provided to DDC:

   a. Asbestos Project Completion Form. If an asbestos project has been performed, a copy of the asbestos project completion form issued by DEP shall be submitted to DOB, with a copy being provided to DDC, prior to the issuance of a DOB permit and to any amendment of the underlying construction document approval which increases the scope of the project to include (a) work area(s) not previously covered.

   b. An Asbestos Project Conditional Close-out Form. If an asbestos project has been performed a copy of the asbestos project conditional close-out form issued by DEP shall be submitted to DOB, with a copy being provided to DDC, prior to the issuance of a DOB permit and to any amendment of the underlying construction document approval which increases the scope of the project to include (a) work area(s) not previously covered.

1.10 QUALITY ASSURANCE

A. All work required for the completion of this project or called for in this Specification must be executed in a workmanlike manner by using the appropriate methods established by regulatory requirements and/or industrial standards. All workmanship or work methods are subject to review and acceptance by the Construction Project Manager. Throughout the Specification, reference is made to codes and standards which establish qualities, levels or types of workmanship which will be considered acceptable. It is the asbestos abatement asbestos abatement contractor's responsibility to comply with these codes and standards during the execution of this work.

B. All materials and equipment required or consumed during the work of this Contract must meet the minimum acceptable criteria established by codes and standards referenced elsewhere in this Specification. Materials and equipment must be submitted for prior approval as part of the asbestos abatement contractor's "Shop Drawings".

C. It is the asbestos abatement a contractor's responsibility, when so required by the Specification or upon written request from the Commissioner or his representative to furnish all required proof that workmanship, materials and/or equipment meet or exceed the codes and standards referenced. Such proof shall be in the form requested, typically a certified report or test conducted by a testing entity approved for that purpose by DDC.

D. The asbestos abatement contractor shall furnish proof that employees working under his supervision have had instruction on the dangers of asbestos exposure, on respirator use, decontamination, and OSHA regulations. This proof shall be in the form of a notarized affidavit to the effect that the above requirements have been satisfied.

E. The a asbestos abatement contractor will have at all times in his possession and in view at the job site the OSHA regulations 29 CFR 1910.1001, and 1926.1101 Asbestos, and Environmental Protection Agency 40 CFR, Part 61, subpart B: National Emission Standard for asbestos, asbestos stripping, work practices and disposal of asbestos waste. He shall also have one copy of NYC Title 15, Chapter 1 of RCNY and NYS DOL ICR 56 at the job site at all times.

F. Familiarity with Pertinent Codes and Standards: In procuring all items used in this work, it is the a asbestos abatement contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this work meet or exceed the specified requirements, and are suitable for their intended use.

G. Rejection of Non Complying Items: The Commissioner reserves the right to reject items incorporated into the work that fail to meet the specified minimum requirements. The Commissioner further reserves the right, and without prejudice to other recourse that maybe taken, to accept non-complying items subject to an adjustment in the Contract amount as approved by the City.

H. Applicable Regulations, Codes and Standards: Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. American National Standards Institute (ANSI)
(Successor to USASI and ASA)
25 West 43rd Street (between 5th and 6th Avenue) 4th Floor
New York, NY 10036
212-642-4900

2. American Society for Testing and Materials (ASTM)
100 Bar Harbor Drive
West Conshohocken, PA 19428-2959
610-832-9500

3. National Institute for Occupational Safety and Health (NIOSH)
Robert A. Taft Laboratory
4676 Columbia Pkwy
Mailstop R12 Cincinnati, Ohio 45226
513-841-4428

4. National Electrical Code (NEC)
   See NFPA

5. National Fire Protection Association (NFPA)
   1 Batterymarch Park
   Quincy, Massachusetts 02169-7471
   617-770-3000

6. New York City Fire Department (FDNY)
   9 Metrotech Center
   Brooklyn, NY 11201-5431
   718-999-2117

7. New York City Department of Buildings (NYC DOB)
   Enforcement Division
   280 Broadway, New York, New York 10007
   212- 566-2850

8. New York City Department of Environmental Protection (NYCDEP)
   Bureau of Environmental Compliance
   Asbestos Control Program
   59-17 Junction Boulevard, 8th Floor
   Corona, New York 11368
   718-595-3682

9. New York City Department of Health and Mental Hygiene (NYC DOHMH)
   Environmental Investigation
   125 Worth Street
   New York, New York 10013
   212-442-3372

10. New York State Department of Labor (NYSDOL)
    Division of Safety and Health
    Engineering Services Unit
    State Office Building Campus
    Albany, New York 12240-0010

11. New York City Department of Sanitation
    125 Worth Street, Room 714
    New York, New York 10013
    212-566-1066

12. Occupational Safety and Health Administration (OSHA)
    Region II - Regional Office
    201Varick Street, Room 908
    New York, New York 10014
    212-337-2378

13. United States Environmental Protection Agency (EPA or USEPA)
Region II
Asbestos NESHAPS Contact
Air and Waste Management Division
(Air Compliance Branch) – USEPA
290 Broadway, 21st Floor
New York, New York 10007-1866
212-637-3660

I. Post all applicable regulations in a conspicuous place at the job site. Assure that the regulations are not altered, defaced or covered by other materials. One copy of each regulation must also be kept at the Asbestos abatement contractor's office.

1.11 CITY/ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITIES

A. The normal occupants of the Work Areas will be relocated by the City prior to the performance of the abatement work and returned there to at the conclusion of the abatement work, at no cost to the asbestos abatement contractor. However, the asbestos abatement contractor shall protect all furniture and equipment in the Work Areas in a manner as hereinafter specified. In addition, the asbestos abatement contractor shall perform the work of this Contract in a manner that will be least disruptive to the normal use of the non-Work Areas in the building.

B. Asbestos abatement contractor shall be responsible for cleaning all portable items not specifically addressed by the Facility, in the Work Areas, or dispose of same as asbestos contaminated waste.

C. Facility to provide asbestos abatement contractor with a list of items that cannot be removed and need special attention.

D. Facility to stop all deliveries that may be scheduled to the Work Area while work is in progress.

E. Facilities to have authorized personnel on site at all times or supply the asbestos abatement contractor with means of contacting such personnel without unreasonable delay. Such personnel shall have access to all areas, have knowledge of electrical, and air handling equipment. Such personnel shall assist the asbestos abatement contractor in case of any power failure or breakdown to shut down air supply systems, to reset and control all protective systems such as alarms, sprinklers, locks, etc. The Facility shall ensure no active air handling systems are operating within the Work Area.

F. City will not occupy the portions of the building, in which work is being performed during the entire asbestos removal operation, including completion of clean up.

G. Asbestos abatement contractor shall provide a plan for 24 hour job security both for prevention of theft and for barring entry of curious but unprotected personnel into Work Areas.

H. Asbestos abatement contractor shall provide surveillance by a fire watch and set forth procedures to be taken for the safety of building occupants in the event of an emergency, in accordance with the WPSP.

I. Should the failure of any utility occur, the City will not be responsible to the asbestos abatement contractor for loss of time or any other expense incurred.

J. Facility will be responsible to notify the asbestos abatement contractor of any planned electrical power shutdowns in order to ensure that there are no power interruptions in the negative air pressure systems.

K. Asbestos abatement contractor shall remove all flammable materials from the work area and all sources of ignition (including but not limited to pilot lights) shall be extinguished.

L. Asbestos abatement contractor shall require a competent person (as defined in OSHA 1926.1101) to perform the following functions and to be on-site continuously for the duration of the project:

1. Monitor the set up of the Work Area enclosure and ensure its integrity.

2. Control entry and exit into the work enclosure.

3. Ensure that employees are adequately trained in the use of engineering controls, proper work practices, proper personal protective equipment and in decontamination procedures.

4. Insure that employees use proper engineering controls, proper work practices, proper personal protective equipment and proper decontamination procedures.

5. The competent person (as defined in OSHA1926.1101) shall check for rips and tears in work suits, and ensure that they are mended immediately or replaced.

1.12 USE OF BUILDING FACILITIES

A. City shall make available to the asbestos abatement contractor, from existing outlets and supplies, all reasonably required amounts of water and electric power at no charge.

B. Electric power to all Work Areas shall be shut down and locked out except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided by asbestos abatement contractor in accordance with applicable codes. All power to Work Areas shall be brought in from outside the area through ground-fault interrupter circuits installed at the source. Stationary electrical equipment within the Work Area, which must remain in service, shall be adequately protected, enclosed and ventilated. The Facility will identify all electric lines that must remain in service. Asbestos abatement contractor shall protect all lines.

C. Asbestos abatement contractor shall provide, at his own expense, all electrical, water, and waste connections, tie-ins, extensions, and construction materials, supplies, etc. All water tie-ins shall be hard piped with polyethylene or copper piping. At the end of each shift, asbestos abatement contractor shall disconnect all hoses within the work zone and place in equipment room of the worker decontamination unit. Asbestos abatement contractor shall ensure positive shutoff of all water to Work Area during non-working hours.

D. Utilities:

1. General:
   All temporary facilities required to be installed, shall be subject to the approval of the Commissioner. Prior to starting the work at any site; specify clearly the temporary locations of facilities preferably with sketches and submit the same to the Construction Project Manager for approval.

2. Water:
   The Department of Design and Construction will furnish all water needed for construction, at no cost to the asbestos abatement contractor in buildings under their jurisdiction. All temporary plumbing or adaptations to supply the needs of the Work Area shall be installed and removed by the asbestos abatement contractor and the cost thereof included in the Lump Sum price for abatement work. Shower water for the decontamination unit shall be provided hot. Heating of water, if necessary, shall be provided by the asbestos abatement contractor.

3. Electricity:
   The Department of Design and Construction will furnish all electricity needed for construction, at no cost to the asbestos abatement contractor in buildings under their jurisdiction. All temporary electrical work or adaptations to supply the needs of the Work Area shall be installed and removed by the asbestos abatement contractor and the cost thereof included in the Lump Sum price for abatement work.

   In leased spaces, arrangements for water supplies and electricity must be made with the landlord. However, all such arrangements must be made through and are subject to approval of the Department of Design and

Construction. Utilities will be provided at no cost to the Asbestos abatement contractor. However, it is the asbestos abatement contractor's (or the General contractor's) responsibility to furnish and install a suitable distribution system to the Work Area. This system will be provided at no cost to the City.

A dedicated power supply for the negative pressure ventilating units shall be utilized. The negative air equipment shall be on a ground fault circuit interrupter (GFCI) protected circuit separate from the remainder of the work area temporary power circuits.

E. Asbestos abatement contractor shall shut down and lock out all electric power to all work areas except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided in accordance with all applicable codes. Existing light sources (e.g., house lights) shall not be utilized. All power to work areas shall be brought in from outside the area through ground-fault circuit interrupter at the source.

1. If electrical circuits, machinery, and other electrical systems in or passing though the work area must stay in operation due to health and safety requirements, the following precautions must be taken:

   a. All unprotected cables, except low-voltage (less than 24 volts) communication and control system cables, panel boxes of cables and joints in live conduit that run through the work area shall be covered with three (3) independent layers of six (6) mil fire retardant polyethylene. Each layer shall be individually duct taped and sealed. All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air sampling results have been obtained.

   b. Any energized circuits remaining in the work area shall be posted with a minimum two (2) inch high lettering warning sign which reads: DANGER LIVE ELECTRICAL - KEEP CLEAR. A sign shall be placed on all live covered barriers at a maximum of ten (10) foot intervals. These signs shall be posted in sufficient numbers to warn all persons authorized to enter the work area of the existence of the energized circuits.

2. Any source of emergency lighting which is temporarily blocked as a result of work place preparation shall be replaced for the duration of the project by battery operated or temporary exit signs, exit lights, or photo luminescent path markings.

F. Asbestos abatement contractor shall provide a separate temporary electric panel board to power asbestos abatement contractor's equipment. The Facility will designate an existing electrical source in proximity to the Work Area. Asbestos abatement contractor's licensed electrician shall provide temporary tie-in via cable,

outlet boxes, junction boxes, receptacles and lights, all with ground fault interruption. At no time shall extension cords greater than 50-feet in length be allowed. All temporary electrical installation shall be in accordance with OSHA regulations. The electric shut down for power panel tie-in will be on off-hours and must be coordinated with the Facility. Asbestos abatement contractor shall provide to the City a specification and drawing outlining his power requirements at the pre-construction meeting.

G. Additional electrical equipment (i.e., transformers, etc.), which is necessary due to the lack of existing power on the floor, shall be at the asbestos abatement contractor's expense.

H. Asbestos abatement contractor shall provide fire protection in accordance with all State and Local fire codes.

I. Sprinklers, standpipes, and other fire suppression systems shall remain in service and shall not be plasticized.

J. When temporary service lines are no longer required, they shall be removed by the asbestos abatement asbestos abatement contractor. Any parts of the permanent service lines, grounds and buildings, disturbed or damaged by the installation and/or removal of the temporary service lines, shall be restored to their original condition by the asbestos abatement asbestos abatement contractor. Senior Stationary Engineer will inspect and test all switches, controls, gauges, etc. and shall submit a list to the Construction Project Manager of any equipment damaged by the asbestos abatement asbestos abatement contractor.

K. Asbestos abatement contractor shall supply hot shower water necessary for use in the decontamination unit.

1.13 USE OF THE PREMISES

A. Asbestos abatement contractor shall confine his apparatus, the storage of materials, and supplies, and the operation of his workmen to limits established by law, ordinances, and the directions of the Construction Project Manager and the Facility. All flammable or combustible materials shall be properly stored to obviate fire and in areas approved by the Facility.

B. Asbestos abatement contractor shall assure that no exits from the building are obstructed, that appropriate safety barriers are established to prevent access, and that Work Areas are kept neat, clean, and safe.

C. Asbestos abatement contractor shall maintain exits from the work area or alternative exits shall be established, in accordance with section 1027 of the New York City Fire Code. Exits shall be checked at the beginning and end of each work shift against blockage or impediments to exiting.

D. If the openings of temporary structural partitions related to abatement work areas block egress, the partition shall consist of two sheets of fire retardant 6-mil plastic, prominently marked as an exit with photo luminescent paint or signage. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress.

E. All surrounding work, fixtures, soil lines, drains, water lines, gas pipes, electrical conduit, wires, utilities, duct work railings, shrubbery, landscaping, etc. which are to remain in place shall be carefully protected and, if disturbed or damaged, shall be repaired or replaced as directed by the City, at no additional cost.

F. All routes through the building to be used by the asbestos abatement contractor shall first be approved by the Construction Project Manager and the Facility.

G. Attention is specifically drawn to the fact that other asbestos abatement contractors, performing the work of other Contracts, may be (or are) brought upon any of the work sites of this Contract. Therefore, the asbestos abatement contractor shall not have exclusive rights to any site of his work and shall fully cooperate and coordinate his work with the work of other asbestos abatement contractors who may be on (or are on) any site of the work of this Contract. Regulated area exempted.

H. Temporary toilet facilities must be provided by the asbestos abatement contractor on the site. Coordinate location of facilities with Construction Project Manager. No toilet facilities will be allowed in the Work Area.

1.14 PROTECTION AND DAMAGE

A. The asbestos abatement contractor is responsible to cover all furniture and equipment that cannot be removed from Work Areas. Moveable furniture and equipment will be removed from Work Areas by asbestos abatement contractor prior to start of work and returned upon successful completion of the final air testing. At the conclusion of the work (after clearance level of air testing reaches the acceptable limit), the asbestos abatement contractor will remove all plastic covering from the walls, floors, furniture, equipment and reinstall furniture and equipment in the cleaned Work Area. The asbestos abatement contractor shall remove all shades, curtains and drapes from the Work Area, and reinstall the same following the final clean up.

B. Prior to plasticizing, the proposed work areas shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning methods. Methods that raise dust, such as sweeping or vacuuming with equipment not equipped with HEPA filters, are prohibited.

C. Use rubber tired vehicles that use non-volatile fuels for conveying material inside building and provide temporary covering, as necessary, to protect floors.

D. No materials or debris shall be thrown from windows or doors of the building. Building waste system shall NOT be used to remove refuse.

E. Debris shall be removed from the work site daily. Premises shall be left neat and clean after each work shift, so that work may proceed the next regular workday without interruption. Limited bag storage may take place within the Work Area when approved by the Construction Project Manager.

F. Protect floors and walls along removal routes from damage, wear and staining with contamination control flooring. All finished surfaces to be protected with Masonite or other rigid sheathing material.

G. A preliminary inspection for pre-existing damage shall be conducted by asbestos abatement contractor and representative of the City before commencement of the project.

1.15 RESPIRATORY PROTECTION REQUIREMENTS

A. Respiratory protection shall be worn by all individuals who may be exposed to asbestos fibers from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring in accordance with Regulations and these Specifications.

B. Asbestos abatement contractor shall develop and implement a written respiratory protection program with required site-specific procedures and elements. The program shall be administered by a properly trained individual. The written respiratory protection program shall include the requirements set forth in OSHA Standard 29 CFR 1910.134, at a minimum.

C. The Asbestos abatement contractor shall provide workers with individually issued and marked respiratory equipment. Respiratory equipment shall be suitable for the asbestos exposure level(s) in the Work Area(s), as specified in OSHA Standards 26 CFR 1910.134 and 29 CFR 1926.1101, NIOSH Standard 42 CFR 84, or as more stringently specified otherwise, herein.

D. Where respirators with disposable filter parts are employed, the asbestos abatement contractor will provide sufficient filter parts for replacement as necessary or as required by the applicable regulation.

E. All respiratory protection shall be NIOSH approved. All respiratory protection shall be provided by asbestos abatement contractor, and used by workers in conjunction with the written respiratory protection program.

F. Asbestos abatement contractor shall provide respirators selected by an Industrial Hygienist that meet the following requirements:

Table 1. -- Assigned Protection Factors

Type of Respirator	Half mask	Full facepiece	Helmet/hood
1. Air-Purifying Respirator	[3]10	50	.....
2. Powered Air-Purifying Respirator (PAPR)	50	1,000	[4]25/1,000
3. Supplied-Air Respirator (SAR) or Airline Respirator			
• Demand mode	10	50	.....
• Continuous flow mode	50	1,000	[4]25/1,000
• Pressure-demand or other positive-pressure mode	50	1,000	.....
4. Self-Contained Breathing Apparatus (SCBA)			
• Demand mode	10	50	50
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	10,000	10,000

Notes:

[1]Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2]The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3]This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4]The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5]These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

G. Selection of high efficiency filters:

1. All high efficiency filters shall have a nominal efficiency rating of 100 (99.97-percent effective) when tested against 0.3-micrometer monodisperse diethyl-hexyl phthalate (DOP) particles.

2. Choose N-, R-, or P-series filters based upon the presence or absence of oil particles.

   a. N-series filters shall only be used for non-oil solid and water based aerosols or fumes.

   b. R- and P-series filters shall be used when oil aerosols or fumes (i.e., lubricants, cutting fluids, glycerin, etc.) are present. The R-series filters are oil resistant and the P-series filters are oil proof.

   c. Follow filter manufacture recommendations.

3. If a vapor hazard exists, use an organic vapor cartridge in combination with the high efficiency filter.

H. Historical airborne fiber level data may serve as the basis for selection of the level of respiratory protection to be used for an abatement task. Historical data provided by the asbestos abatement contractor shall be based on personal air monitoring performed during work operations closely resembling the processes, type of material, control methods, work practices, and environmental conditions present at the site. Documentation of aforementioned results may be requested by the City and/or Third-Party Air Monitor for review. This will not relieve the asbestos abatement contractor from providing personal air monitoring to determine the time-weighted average (TWA) for the work under contract. The TWA shall be determined in accordance with 29 CFR 1926.1101.

I. At no time during actual removal operations shall half-mask air purifying respirators be allowed unless a full 8-hour TWA and excursion limit have been conducted, and reviewed by the Construction Project Manager. If the TWA and excursion limit have not been conducted, a Supplied-Air Respirator (SAR) or Airline Respirator or Self-Contained Breathing Apparatus (SCBA) must be used. Use of single use dust respirators is prohibited for the above respiratory protection.

J. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.

K. Asbestos abatement contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every 12 months thereafter with the type of respirator he/she will be using.

L. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.

M. No facial hairs (beards) shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.

N. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the asbestos abatement contractor at the asbestos abatement contractor's expense.

O. Respiratory protection maintenance and decontamination procedures shall meet the following requirements:

1. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134 (b); and

2. High efficiency filters for negative pressure respirators shall be changed after each shower; and

3. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures as stated in Section 3.03 and/or 3.04.

4. Airline respirators with high efficiency filtered disconnect shall be disconnected in the equipment room and worn into the shower. Powered air-purifying respirator face pieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers recommendations; and

5. Respirators shall be stored in a dry place and in such a manner that the face-piece and exhalation valves are not distorted; and

6. Organic solvents shall not be used for washing of respirators.

P. Authorized visitors shall be provided with suitable respirators and instruction on the proper use of respirators whenever entering the Work Area. Qualitative fit test shall be done to ensure proper fit of respirator.

1.16 PROTECTIVE CLOTHING

A. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. Provide to all workers, foremen, superintendents, authorized visitors and inspectors, protective disposable clothing consisting of full

body coveralls, head covers, gloves and 18-inch high boot type covers or reusable footwear.

B. In addition to personal protective equipment for workers, the asbestos abatement contractor shall make available at each worksite at least four (4) additional uniforms and required respiratory equipment each day for personnel who are authorized to inspect the work site. He/she shall also provide, for the duration of the work at any site involving a decontamination unit for worksite access, a lockable storage locker for use by the Construction Project Manager. In addition to respiratory masks for workers, the asbestos abatement contractor must have on hand at the beginning of each work day, at least four (4) masks each with two sets of fresh filters, for use by personnel who are authorized to inspect the worksite. The asbestos abatement contractor shall check for proper fit of the respirators of all City personnel authorized to enter the Work Area.

C. Asbestos handlers involved in tent procedures shall wear two (2) disposable suits, including gloves, hood and footwear, and appropriate respiratory equipment. All street clothes shall be removed and stored in a clean room within the work site. The double layer personal protective equipment shall be used for installation of the tent and throughout the procedure, if a decontamination unit (with shower and clean room) is contiguous to the Work Area, only one (1) layer of disposable personal protective equipment shall be required; in this case, prior to exiting the tent the worker shall HEPA vacuum and wet clean the disposable suit.

D. The outer disposable suit (if 2 suits are worn) shall be removed and remain in the tent upon exiting. Following the tent disposal and work site clean up the workers shall immediately proceed to a shower at the work site. The inner disposal unit and respirator shall be removed in the shower after appropriate wetting. The disposal clothing shall be disposed of as asbestos-containing waste material. The workers shall then fully and vigorously shower with supplied liquid bath soap, shampoo, and clean dry towels.

E. Coveralls: provide disposable full-body coveralls and disposable head covers. Require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes for all workers in the Work Area.

F. Boots: provide work boots with non-skid soles, and where required by OSHA, foot protection, for all workers. Provide boots at no cost to workers. Paint uppers of all boots yellow with waterproof enamel. Do not allow boots to be removed from the Work Area for any reason after being contaminated with ACM and/or dust.

G. Hard Hats: provide hard hats as required by OSHA for all workers, and provide a minimum of four spares for Inspectors, visitors, etc. Label all hats with same warning label as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may cause potential head injury. Provide hard hats of the type with polyethylene strap suspension. Require hats to remain in the Work

Area throughout the work. Thoroughly clean and decontaminate and bag hard hats prior to removing them from the Work Area at the end of the work.

H. Goggles: provide eye protection (goggles) as required by OSHA for all workers involved in any activity that may potentially cause eye injury. Require them to be worn at all times during these activities. Thoroughly clean and decontaminate goggles before removing them from the Work Area.

I. Gloves: provide work gloves to all workers, of the type dictated by the Work and OSHA Standards. Do not remove gloves from the Work Area. Dispose of as asbestos-asbestos contaminated waste at the end of the work. Gloves shall be worn at all times, except during Work Area Preparation activities that do not disturb ACM.

J. Reusable footwear, hard hats and eye protection devices shall be left in the contaminated Equipment Room until the end of the Asbestos Abatement Work.

K. Disposable protective clothing shall be discarded and disposed of as asbestos waste every time the wearer exits from the workspace to the outside through the decontamination facility.

L. Respirators, disposable coveralls, head covers and foot covers shall be provided by the asbestos abatement contractor for the Facilities Representative, Construction Project Manager and any other authorized representative who may inspect the Work Area. Provide two respirators and six respirator filter changes per day.

1.17 AIR MONITORING - ASBESTOS ABATEMENT CONTRACTOR

A. Asbestos abatement contractor shall employ a qualified industrial hygiene laboratory to analyze air samples in accordance with OSHA Regulations, 1926.1101 (Asbestos Standards for Construction) and New York City regulations.

B. The industrial hygiene laboratory shall be a current proficient participant in the American Industrial Hygiene Association (AIHA) PAT Program. The laboratory identification number shall be submitted and approved by the City. The laboratory shall be accredited by the AIHA and New York State Department of Health Environmental Laboratory Approval Program (ELAP).

C. Industrial hygiene laboratory shall also be a current proficient participant in the NIST/NVLAP Quality Assurance Program for the identification of bulk samples. Laboratory identification number shall be submitted to and approved by the City.

D. Air monitoring responsibilities for the asbestos abatement contractor's employees, shall be performed by a representative of the industrial hygiene laboratory retained by the asbestos abatement contractor.

E. Asbestos abatement contractor shall submit to the City all credentials of the designated (as defined in OSHA 1926.1101) and industrial hygiene laboratory representative for approval.

F. Air monitoring and inspection shall be conducted by the Asbestos abatement contractor's competent person (as defined in OSHA 1926.1101).

G. Continuous (daily or per shift) monitoring and inspection will include Work Area samples, personnel samples from the breathing zone of a worker to accurately determine the employees' 8-hour TWA (unless Type C respirators are used) and decontamination unit clean room samples.

H. Work Area samples and employee personnel samples shall be taken using pumps whose flow rates can be determined to an accuracy of +5-percent, at a minimum of two liters per minute. This must be demonstrated at the job site.

I. Sampling and analysis methods shall be per NIOSH 7400A.

J. Test Reports:

1. Promptly process and distribute one copy of the test results, to the Commissioner.

2. Prompt reports are necessary so that if required, modifications to work methods and/or practices may be implemented as soon as possible.

3. Asbestos abatement contractor shall by facsimile notify the Commissioner within 24 hours of the results of each test, followed by written notification within three days.

K. Competent person shall conduct inspections and provide written reports daily. Inspections will include checking the standard operating procedures, engineering control systems, respiratory protection and decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project which may affect the health and safety of the people and environment.

L. All costs for required air monitoring by the asbestos abatement contractor's competent person shall be borne by the asbestos abatement contractor.

M. The City reserves the right to conduct air and surface dust sampling in conjunction with and separate from the Third-Party Air Monitor for the purposes of Quality Assurance.

N. All samples shall be accompanied by a Chain of Custody Record that shall be submitted to the Construction Project Manager upon completion of analysis.

1.18 THIRD PARTY MONITORING AND LABORATORY

A. The NYCDDC, at its own expense, will employ the services of an independent Third Party Air Monitoring Firm and Laboratory. The Third Party Air Monitor will perform air sampling activities and project monitoring at the Work Site.

B. The Laboratory will perform analysis of air samples utilizing Phase Contrast Microscopy (PCM) and/or Transmission Electron Microscopy (TEM). This laboratory shall meet the standards stated in Paragraph 1.17. B.

C. Observations will include, but not be limited to, checking the standard operating procedures, engineering control systems, respiratory protection, decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project that may affect the health and safety of the environment, Asbestos abatement contractor, and/or facility occupants.

D. The Third Party Air Monitoring Firm and the designated Project Monitor shall have access to all areas of the asbestos removal project at all times and shall continuously inspect and monitor the performance of the asbestos abatement contractor to verify that said performance complies with this Specification. The Third-Party Air Monitor shall be on site throughout the entire abatement operation.

E. The NYCDDC will be responsible for costs incurred with the Third Party Air Monitoring Firm and laboratory work. Any subsequent additional testing required due to limits exceeded during initial testing shall be paid for by the Asbestos abatement contractor.

F. At a minimum, air sampling shall be conducted in accordance with the following schedule:

Abatement Activity	Pre-Abatement	During Abatement	Post-Abatement
Equal to or greater than 10,000 square feet or 10,000 linear feet of ACM	PCM	PCM	TEM
Less than 10,000 square feet or 10,000 linear feet of ACM	PCM	PCM	PCM

Note: TEM is acceptable wherever PCM is required.

G. The number of air samples required per stage of abatement and size of abatement project is listed in the table below:

		Pre-Abatement	During Abatement	Post Abatement
	Large Asbestos Projects			
1.	Full Containment	10	5	10
2.	Glovebag inside Tent	5[a]	5[a]	5[a]
3.	Exterior Foam and Vertical Surfaces	-	5[c]	5[d]
4.	Interior Foam	10	5[c]	10[d]
	Small Asbestos Projects			
1.	Full Containment	6	3	6
2.	Glovebag inside Tent	3[b]	3[b]	3[b]
3.	Tent	3[b]	3[b]	3[b]
4.	Exterior Foam and Vertical Surfaces	-	3[c]	3[d]
5.	Interior Foam	6	3[c]	6[d]
	Minor Projects			
1.	Glovebag inside Tent	-	-	1[d]
2.	Tent	-	-	1[d]
3.	Exterior Foam and Vertical Surfaces	-	-	1[d]
4.	Interior Foam	-	-	1[d]

Notes:

a. if more than three (3) tents then two (2) samples required per enclosure.
b. if more than three (3) tents then one (1) sample required per enclosure.
c. samples shall be taken within the work area(s).
d. area sampling is required only if:
- visible emissions are detected during the project
- during-abatement area sampling results exceeded 0.01 f/cc or the pre-abatement area sampling result(s) for interior projects where applicable.
- work area to be reoccupied is an interior space at a school, healthcare, or daycare facility.

H. Prior to commencement of abatement activities, the Third Party Air Monitoring Firm will collect a minimum number of area samples inside each homogeneous work area.

1. Samples will be taken during normal occupancy activities and circumstances at the work site.

2. Samplers shall be located within the proposed work area and at all proposed isolation barrier locations.

3. Samples shall be analyzed using PCM.

4. The number of samples to be collected will be determined by the size of the project and the abatement methods to be utilized.

I. Frequency and duration of the air sampling during abatement shall be representative of the actual conditions during the abatement. The size of the asbestos project will be a factor in the number of samples required to monitor the abatement activities. The following minimum schedule of samples shall be required daily.

1. For large asbestos projects employing full containment, area air sampling shall be performed at the following locations:

a. Two area samples outside the work area in uncontaminated areas of the building, remote from the decontamination facilities.

(1) Primary location selection shall be within 10 feet of isolation barriers.

(2) Where negative ventilation exhaust runs through uncontaminated building areas, one of the area samples will be required in these areas to monitor any potential fiber release.

(3) Where exhaust tubes have been grouped together in banks of up to five (5) tubes, with each tube exhausting separately and the bank of tubes terminating together at the same controlled area, one area air sample shall be taken.

b. One area sample within the uncontaminated entrance to each decontamination enclosure system.

c. Where adjacent non-work areas do not exist, an exterior area sample shall be taken.

d. One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors but not within a duct.

e. One area sample outside, but within 25 feet of, the building or structure, if the entire building or structure is the work area.

2. For large asbestos projects involving interior foam method, area air sampling shall be performed at the following sampling locations:

   a. One area sample taken outside the work area within 10 feet of isolation barriers.

   b. One area sample taken within the uncontaminated entrance to each worker decontamination and waste decontamination enclosure system.

   c. One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors but not within a duct, if applicable.

   d. Three area samples inside the work area.

   e. One area sample where the negative ventilation exhaust ducting runs through uncontaminated building areas, if applicable.

3. For large asbestos projects employing the glovebag procedure within a tent, a minimum of five continuous air samples shall be taken concurrently with the abatement for each work area, unless there are more than three enclosures, in which case two area samples per enclosure are required.

   a. Four area samples taken outside the work area within ten feet of tent enclosure(s).

   b. One area sample taken within the uncontaminated entrance to each worker and waste decontamination enclosure system.

   c. One area sample within five feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors, but not within a duct, if applicable.

   d. One area sample where negative ventilation exhaust ducting runs through uncontaminated building areas, if applicable.

4. For large asbestos projects involving exterior foam method or removal of ACM from vertical surfaces, a minimum of five continuous area samples shall be taken concurrently with the abatement for each work area using the following minimum requirements:

   a. Three area samples inside the work area and remote from the decontamination systems.

b. One area sample within the uncontaminated entrance to each worker and waste decontamination enclosure system.

c. One area sample outside the work area within 25 feet of the building or structure, if the entire building or structure is the work area.

d. One area sample inside the building or structure at the egress point to the work area, if applicable.

5. For small asbestos projects employing full containment, a minimum of three continuous area samples shall be taken concurrently with the abatement for each work area at the following locations:

a. Two area samples taken outside the work area within ten feet of the isolation barriers.

b. One area sample within the uncontaminated entrance to each worker or waste decontamination enclosure system.

c. One area sample within five feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors, but not within a duct, if applicable.

d. One area sample where negative ventilation exhaust ducting runs through an uncontaminated building area, if applicable.

6. Tent Procedures:
For projects involving more than 25 linear feet or 10 square feet, a minimum of three continuous samples shall be taken concurrently throughout abatement.

J. Post-abatement clearance air monitoring for projects not solely employing glove-bag procedures shall include a minimum number of area samples inside each homogeneous work area and outside each homogeneous work area (five samples inside/five samples outside for Large Projects and three samples inside/three samples outside for Small Projects). In addition to the five sample inside/five sample outside minimum for Large Projects, one additional representative area sample shall be collected inside and outside the work area for every 5,000 square feet above 25,000 square feet of floor space where ACM has been abated.

K. Post-abatement clearance air monitoring for Small Projects solely employing glove-bag procedures is not required unless one or more of the following events occurs. In such cases, post-abatement clearance air monitoring procedures shall be followed. The events requiring post-abatement clearance air monitoring are:

1. The integrity of the glove-bag was compromised,

2. Visible emissions are detected outside the glove-bag, and/or

3. Ambient levels exceed 0.01 f/cc during abatement.

L. Monitoring requirements for other than post-abatement clearance air monitoring are as follows:

1. The sampling zone for indoor air samples shall be representative of the building occupants' breathing zone.

2. If possible, outdoor ambient and baseline samplers should be placed about 6 feet above the ground surface in reasonable proximity to the building and away from obstructions and drafts that may unduly affect airflow.

3. For outdoor samples, if access to electricity and concerns about security dictate a rooftop site, locations near vents and other structures on the roof that would unduly affect airflow shall be avoided.

4. Air sampling equipment shall not be placed in corners of rooms or near obstructions such as furniture.

5. Samples shall have a chain of custody record.

M. Area air sampling during abatement shall be conducted as specified in the following documents except as restricted or modified herein:

1. Measuring Airborne Asbestos Following an Abatement Action, US EPA document 600/4-85-049 (Nov., 1985);

2. Guidance for Controlling Asbestos-Containing Materials in Buildings; US EPA Publication 560/5-85- 024 (June, 1984);

3. Methodology for the Measurement of Airborne Asbestos by Electron Microscopy US EPA Contract No. 68-02- 3266;

4. Mandatory and non-mandatory Electron Microscopy Methods set forth in 40 CFR Part 763, Subpart E, Appendix A.

5. NIOSH 7400 method using "A" counting rules

N. In accordance with the above criteria, area samples (see NYCDEP Asbestos Control Program Regulations) shall conform to the following schedule:

Area Samples for Analysis by	Minimum Volume	Flow Rate
PCM, 25mm cassettes	560 liters	5 to 15 liters/minute
TEM, 25mm cassettes	560 liters	1 to 10 liters/minute
TEM, 37mm cassettes	1,250 liters	1 to 10 liters/minute

O. Post-abatement clearance air monitoring requirements are as follows:

1. Sampling shall not begin until at least one hour after wet cleaning has been completed and no visible pools of water or condensation remain.

2. Samplers shall be placed at random around the work area. If the work area contains the number of rooms equivalent to the number of required samples based on floor area, a sampler shall be placed in each room. When the number of rooms is greater than the required number of samples, a representative sample of rooms shall be selected.

3. The representative samplers placed outside the work area but within the building shall be located to avoid any air that might escape through the isolation barriers and shall be approximately 50 feet from the entrance to the work area, and 25 feet from the isolation barriers.

P. The following aggressive sampling procedures shall be used within the work area during all clearance air monitoring:

1. Before starting the sampling pumps, use forced air equipment (such as a one horsepower leaf blower) to direct exhaust air against all walls, ceilings, floors, ledges and other surfaces in the work area. This pre-sampling procedure shall take at least five minutes per 1,000 square feet of floor area; then

2. Place a 20-inch diameter fan in the center of the room. Use one fan per 10,000 cubic feet of room space. Place the fan on slow speed and point it toward the ceiling.

3. Start the sampling pumps and sample for the required time or volume.

4. Turn off the pump and then the fan(s) when sampling is completed.

5. Collect a minimum number of area samples inside and outside each homogeneous work area (five inside/five outside samples for Large Projects and three inside/three outside samples for Small Projects). In addition to the minimum for Large Projects, one representative area samples shall be collected inside and outside the work area for every 5,000 square feet above 25,000 square feet of floor space where ACM has been abated.

Q. For post-abatement monitoring, area samples shall conform to the following schedule:

Area Samples for Analysis by	Minimum Volume	Flow Rate
PCM	1,800 liters	5 to 15 liters/minute
TEM	1,250 liters	1 to 10 liters/minute

1. Each homogeneous work area that does not meet the clearance criteria shall be thoroughly re-cleaned using wet methods, with the negative pressure ventilation system in operation. New samples shall be collected in the work area as described above. The process shall be repeated until the work site meets the clearance criteria.

2. For an asbestos project with more than one homogeneous work area, the release criterion shall be applied independently to each work area.

3. Should airborne fiber concentrations exceed the clearance criteria, the asbestos abatement contractor shall re-clean the work area utilizing wet wiping and HEPA-vacuuming techniques. Following completion of re-cleaning activities, the Third-Party Air Monitor will perform an observation of the Work Area. If the Third-Party Air Monitor determines that the work was performed in accordance with the specifications, the appropriate settling period will be observed and additional air sampling will be performed.

4. All costs resulting from additional air tests and observations shall be borne by the asbestos abatement contractor. These costs may include, but are not limited to, labor, analysis fees, materials, and expenses.

5. After the area has been found to be in compliance, the asbestos abatement contractor may remove Isolation Barriers and perform final cleaning as specified.

R. Clearance and/or Re-occupancy Criteria:

1. The clearance criteria shall be applied to each homogeneous work area independently.

2. For PCM analysis, the clearance air monitoring shall be considered satisfactory when each of the 5 inside/5 outside samples for Large Projects and/or 3 inside/3 outside samples for Small Projects is less than or equal to 0.01 f/cc or the background concentrations, whichever is greater.

3. For TEM analysis, the clearance air monitoring shall be considered satisfactory when the requirements stated in 40 CFR Part 763, Subpart E, Appendix A, Section IV are met.

4. As soon as the air monitoring tests are completed, the Third-Party Air Monitor will send the results of such tests to the City and notify the Asbestos abatement contractor.

5. The asbestos abatement contractor shall initiate the appropriate closeout information into the DEP ARTS database within 24 hours of work area completion to allow the Third Party Air Monitoring Firm to complete and submit the ACP-15 forms for each specific work area.

6. The asbestos abatement contractor shall provide the ACP-20 and ACP-21 forms to the Third Party Air Monitoring Firm within 48 hours of receipt.

1.19 TAMPERING WITH TEST EQUIPMENT

All parties to this Contract are hereby notified that any tampering with testing equipment will be considered an attempt at falsifying reports and records to federal and state agencies and each offense will be prosecuted under applicable state and federal criminal codes to the fullest extent possible.

1.20 GUARANTEE

A. Work performed in compliance with this Contract shall be guaranteed for a period of one year from the date the completed work is accepted by the City.

B. The asbestos abatement contractor shall not be held liable for the guarantee where the repair required under the guarantee is a result of obvious abuse or vandalism, as determined by the Commissioner.

C. The City will notify the asbestos abatement contractor in writing regarding defects in work under the guarantee.

PART 2 – PRODUCTS

2.01 MATERIAL HANDLING

A. Deliver all materials to the job site in their manufacturer's original container, with the manufacturer's label intact and legible.

1. Maintain packaged materials with seals unbroken and labels intact until time of use.

2. Store all materials on pallets, away from any damp and/or wet surface. Cover materials in order to prevent damage and/or contamination.

3. Promptly remove damaged materials and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the City.

B. The Construction Project Manager may reject as non-complying such material and products that do not bear identification satisfactory to the Construction Project Manager as to manufacturer, grade, quality and other pertinent information.

2.02 MATERIALS

A. Wetting agents: (Surfactant) shall consist of resin materials in a water base, which have been tested to ensure materials are non-toxic and non-hazardous. Surfactants shall be installed according to the manufacturer's written instructions.

B. Encapsulants: Liquid material which can be applied to asbestos-containing material which temporarily controls the possible release of asbestos fibers from the material or surface either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

C. During abatement activities, replacement materials shall be stored outside the work area in a manner to prevent contamination. Materials required for the asbestos project (i.e., plastic sheeting, replacement filters, duct tape, etc.) shall be stored to prevent damage or contamination.

D. Framing Materials and Doors: As required to construct temporary decontamination facilities and isolation barriers. Lumber shall be high grade, new, finished one side and fire retardant.

E. Fire Retardant Polyethylene Sheeting: minimum uniform thickness of 6-mil. Provide largest size possible to minimize seams. All materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

F. Fire Retardant Reinforced Polyethylene Sheeting: For covering floor of decontamination units, provide translucent, nylon reinforced or woven polyethylene laminated, fire retardant polyethylene sheeting. Provide largest size possible to minimize seams, minimum uniform thickness 6-mil. All materials used

in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

G. Drums: Asbestos-transporting drums, sealable and clearly marked with warning labels as required by OSHA and EPA.

H. Polyethylene Disposal Bags: Asbestos disposal bags, minimum of fire retardant 6-mil thick. Bags shall be clearly marked with warning labels as required by OSHA and EPA.

I. Signs: Asbestos warning signs for posting at perimeter of Work Area, as required by OSHA and EPA.

J. Waste Container Bag Liners and Flexible Trailer Trays: One piece leak-resistant flexible tray with absorbent pad.

K. Tape: Provide tape which is of high quality with an adhesive that is formulated to aggressively stick to sheet polyethylene.

L. Spray Adhesive: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

M. Flexible Duct: Spiral reinforced flex duct for air filtration devices.

N. Protective Clothing: Workers shall be provided with sufficient sets of properly fitting, full-body, disposable coveralls, head covers, gloves, and 18-inch high boot-type foot covers. Protective clothing shall conform to OSHA Standard 29 CFR 1926.1101.

O. Surfactants, strippers, sealers, or any other chemicals used shall be non-carcinogenic and non-toxic.

P. Materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

2.03 TOOLS AND EQUIPMENT

A. Air Filtration Device (AFD): AFDs shall be equipped with High Efficiency Particulate Air (HEPA) filtration systems and shall be approved by and listed with Underwriter's Laboratory.

B. Scaffolding: All scaffolding shall be designed and constructed in accordance with OSHA (29 CFR 1926/1910), New York City Building Code, and any other applicable federal, state and local government regulations. Whenever there is a conflict or overlap of the above references the most stringent provisions are applicable. All scaffolding and components shall be capable of supporting without failure a minimum of four times the maximum intended load, plus an allowance

for impact. All scaffolding and staging must be certified in writing by a Professional Engineer licensed to practice in the State of New York.

1. Equip rungs of all metal ladders, etc., with an abrasive, non-slip surface.

2. Provide non-skid surface on all scaffold surfaces subject to foot traffic. Scaffold ends and joints shall be sealed with tape to prevent penetration of asbestos fibers.

C. Transportation Equipment: Transportation Equipment, as required, shall be suitable for loading, temporary storage, transit and unloading of asbestos contaminated waste without exposure to persons or property. Any temporary storage containers positioned outside the building for temporary storage shall be metal, closed and locked.

D. Vacuum Equipment: All vacuum equipment utilized in the Work Area shall utilize HEPA filtration systems.

E. Vacuum Attachments: Soft Brush Attachment, Asbestos Scraper Tool, Drill Dust Control Kit.

F. Electric Sprayer: An electric airless sprayer suitable for application of encapsulating material and shall be approved by and listed with Underwriters Laboratory.

G. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

H. Water Atomizer: Powered air-misting device equipped with a ground fault interrupter and equipped to operate continuously.

I. Brushes: All brushes shall have nylon bristles. Wire brushes are excluded from use due to their potential to shred asbestos fibers into small, fine fibers. Wire brushes maybe used for cleaning pipe joints within glove-bags upon written approval of the Construction Project Manager.

J. Power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation. Abrasive removal methods, including the use of beadblasters, are prohibited.

K. Other Tools and Equipment: Asbestos abatement contractor shall provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, sponges, rounded-edge shovels, brooms, and carts.

L. Fans and Leaf Blower: Provide Leaf Blower (one leaf blower per floor) and one 20-inch diameter fans for each 10,000 cubic feet of Work Area volume to be used for aggressive sampling technique for clearance air testing.

M. Fire Extinguishers: At least one fire extinguisher with a minimum rating 2-A:10-B:C shall be required for each work place. In the case of large asbestos projects, at least two such fire extinguishers shall be required.

N. First Aid Kits: Asbestos abatement contractor shall maintain adequately stocked first aid kits in the clean rooms of the decontamination units and within Work Areas. The first aid kit shall be approved by a licensed physician for the work to be performed under this Contract.

O. Water Service:

1. Temporary Water Service Connection: All connections to the Facilities water system shall include back flow protection. Valves shall be temperature and pressure rated for operation of the temperature and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping, and equipment. Leaking or dripping fittings/valves shall be repaired and or replaced as required.

2. Water Hoses: Employ new heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each Work Area and to each Decontamination Enclosure Unit. Provide fittings as required for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

3. Water Heater: Provide UL rated 40-gallon electric water heaters to supply hot water for Personal Decontamination Enclosure System Shower. Activate from 30 Amp Circuit breakers located within the Decontamination Enclosure sub panel. Provide relief valve compatible with water heater operations, pipe relief valve down to drip pan at floor level with type 'L' copper piping. Drip pans shall be 6-inch deep and securely fastened to water heater. Wiring of the water heater shall comply with NEMA, NECA, and UL standards.

P. Electrical Service:

1. General: Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service.

2. Temporary Power: Provide service to decontamination unit sub panel with minimum 60 AMP, two pole circuit breaker or fused disconnect connected to the building's main distribution panel. Sub panel and disconnect shall be

sized and equipped to accommodate all electrical equipment required for completion of the work.

3. Voltage Differences: Provide identification warning signs at power outlets that are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.

4. Ground Fault Protection: Equip all circuits for any purpose entering Work Area with ground fault circuit interrupters (GFCI). Locate the GFCIs outside the Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for all circuits to be used for any purpose in Work Area, decontamination units, exterior, or as otherwise required by NEC, OSHA or other authority.

5. Power Distribution System: Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead, and rise vertically where wiring will be least subject to damage from operations.

6. Temporary Wiring: In the Work Area shall be type UF non-metallic sheathed cable located overhead and exposed for surveillance. Provide liquid tight enclosures or boxes for all wiring devices. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors.

7. Electrical Power Cords: Use only grounded extension cords; use hard service cords where exposed to traffic and abrasion. Use single lengths of cords only.

8. Temporary Lighting: All lighting within the Work Area shall be liquid and moisture proof and designed for the use intended.

    a. Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting.

    b. Provide lighting in the Decontamination Unit as required to supply a minimum 50-foot candle light level.

9. If electrical circuits, machinery, and other electrical systems in or passing though the work area must stay in operation due to health and safety requirements, the following precautions must be taken:

    a. All unprotected cables, except low-voltage (less than 24 volts) communication and control system cables, panel boxes of cables and joints in live conduit that run through the work area shall be covered

with three (3) independent layers of six (6) mil fire retardant polyethylene. Each layer shall be individually duct taped and sealed. All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air sampling results have been obtained.

2.04 CLEANING

A. Throughout the construction period, the asbestos abatement contractor shall maintain the building as described in this Section.

1. The asbestos abatement contractor shall prevent building areas other than the Work Area from becoming contaminated with asbestos-containing dust or debris. Should areas outside the Work Area become contaminated with asbestos-containing dust or debris as a consequence of the asbestos abatement contractor's work practices, the asbestos abatement contractor shall be responsible for cleaning these areas in accordance with the procedures appended in Title 15, Chapter 1 of RCNY and NYSDOL ICR56. All costs incurred in cleaning or otherwise decontaminating non-Work Areas and the contents thereof shall be borne by the asbestos abatement contractor at no additional cost to the City.

2. The asbestos abatement contractor shall provide to all personnel and laborers the required equipment and materials needed to maintain the specified standard of cleanliness.

B. General

1. Waste water from asbestos removal operations, including shower water, may be discharged into the public sewer system only after approved filtration is on operation to remove asbestos fibers.

2. Asbestos wastes shall be double bagged in six mil (.006") fire retardant polyethylene bags approved for ACM disposal and shall be properly labeled and handled before disposal.

3. All waste generated shall be bagged, wrapped or containerized immediately upon removal. The personal and waste decontamination enclosure systems and floor and scaffold surfaces shall be HEPA vacuumed and wet cleaned at the end of each work shift at a minimum.

4. The asbestos abatement contractor shall use corrugated cartons or drums for disposal of asbestos-containing waste having sharp edged components (e.g., nails, screws, metal lathe and tin sheeting) that may tear polyethylene bags and sheeting. The waste within the drums or cartons must be double bagged.

5. The asbestos abatement contractor shall transport all bags of waste to disposal site in thirty gallon capacity metal or fiber drums with tight lids, or in locked steel dumpster.

6. Dumping of debris, waste or bagged waste will not be permitted.

7. The waste decontamination enclosure system shall be wet cleaned twice using wet cleaning methods upon completion of waste removal. When the worker decontamination enclosure shower room alternates as a waste container wash room, the shower room shall be washed immediately with cloths or mops saturated with a detergent solution prior to wet cleaning.

8. Excessive water accumulation or flooding in the work area shall require work to stop until the water is collected and disposed of properly.

9. ACM shall be collected utilizing rubber dust pans and rubber squeegees.

10. HEPA vacuums shall not be used on wet materials unless specifically designed for that purpose.

11. Metal shovels shall not be used within the work area.

12. Mastic solvent when used will be applied in moderation (e.g., by airless sprayer). Saturation of the concrete floor with mastic solvent must be avoided.

13. The asbestos abatement contractor shall retain all items in the storage area in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection of all materials.

14. The asbestos abatement contractor shall not allow accumulation of scrap, debris, waste material, and other items not required for use in this work. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with New York City Department of Sanitation (NYCDOS) regulation Title 16 Chapter 8, and Federal, State and City laws.

15. At least twice a week (more if necessary), the asbestos abatement contractor shall completely remove all scrap, debris and waste material from the job site.

16. The asbestos abatement contractor shall provide adequate storage space for all items awaiting removal from the job site, observing all requirements for fire protection and concerns for the environment.

17. All respiratory protection equipment shall be selected from the latest NIOSH Certified Equipment list.

18. Daily and more often, if necessary, the asbestos abatement contractor shall inspect the Work Areas and adjoining spaces, and pick up all scrap, debris, and waste material. All such items shall be removed to the place designated for their storage.

19. Weekly, and more often, if necessary, the asbestos abatement contractor shall inspect all arrangements of materials stored on the site; re-stack and tidy them or otherwise service them to meet the requirements of these Specifications.

20. The asbestos abatement contractor shall maintain the site in a neat and orderly condition at all times.

PART 3 – EXECUTION

3.01 WORKER DECONTAMINATION FACILITY

A. Large Asbestos Projects (Small Project Option):

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas

a. Structure:

(1) Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 16 inches on-center.

(2) When worker decontamination unit is located outdoors, in areas with public access, or in correctional facilities, frame work shall be lined with minimum 3/8" thickness fire rated plywood sheathing. Sheathing shall be caulked or taped airtight at all joints and seams.

(3) Interior shall be covered with two layers of fire retardant 6-mil polyethylene sheeting, with a minimum overlap of 12 inches at seams. Seal seams airtight using tape and adhesive. The interior floor shall be covered with two (2) layers of reinforced fire-retardant polyethylene sheeting with a minimum overlap on the walls of twelve inches.

(4) Entrances to the decontamination unit shall be secured with lockable hinged doors. Doors shall be open at all times when abatement operations are in progress. Doors shall be louvered

to allow for air movement through the decontamination units into Work Area.

b. Curtained Doorways: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

c. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart.

d. Decontamination Enclosure System shall be placed adjacent to the Work Area and shall consist of three totally enclosed chambers, separated from Work Area and each other by airlocks, as follows:

(1) Equipment Room: The equipment room shall have a curtain doorway to separate it from the Work Area, and share a common airlock with the shower room. The equipment room shall be large enough to accommodate at least one worker (allowing them enough room to remove their protective clothing and footwear), and a fire retardant 6-mil disposal bag for collection of discarded clothing and equipment. The equipment room shall be utilized for the storage of equipment and tools after decontamination using a HEPA-vacuum and/or wet cleaning. A one-day supply of replacement filters, in sealed containers, for HEPA-vacuums and negative air machines, extra tools, containers of surfactant, and other materials and equipment required for the project shall be stored here. A walk-off pan filled with water shall be placed in the Work Area just outside the equipment room for persons to clean foot coverings when leaving the Work Area. Contaminated footwear and reusable work clothing shall be stored in this room.

(2) Shower Room: The shower room shall have two airlocks (one that separates it from the equipment room and one that separates it from the clean room). The shower room shall contain at least one shower, with hot and cold water adjustable at the tap, per six workers. Careful attention shall be given to the shower to ensure against leaking of any kind and shall contain a rigid catch basin at least six inches deep. Asbestos abatement contractor shall supply towels, shampoo and liquid soap in the shower room at all times. Shower water shall be continuously drained, collected, and filtered through a system with at least a 5-micron particle size collection capacity. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filters by large particles. Pumps shall be installed, maintained

and utilized in accordance with manufacturer's recommendations. Filtered water shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.

(3) Clean Room: The clean room shall share a common airlock with the shower room and shall have a curtained doorway to separate it from outside non-contaminated areas. Lockers, for storage of workers' street clothing, and shelves, for storing respirators, shall be provided in this area. Clean disposable clothing, replacement filters for respirators, and clean dry towels shall be provided in the clean room. The clean room shall not be used for the storage of tool, equipment or other materials.

B. Small Asbestos Projects:

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas.

2. The worker decontamination enclosure system shall consist of, as a minimum, an equipment room, a shower room, and a clean room separated from each other and from the work area by curtained doorways. The equipment storage, personnel gross decontamination and removal of disposal clothing shall occur in the equipment room prior to entering the shower. All other requirements shall be the same as described above for a large asbestos project.

3. For small asbestos projects with only one exit from the work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage. All other requirements shall be the same as described above for a large asbestos project.

C. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Asbestos abatement contractor, and as specified herein.

3.02 WASTE DECONTAMINATION FACILITY

A. Large Asbestos Project (Small Project Option)

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas.

a. Structure:

(1) Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 16 inches on-center.

(2) When worker decontamination unit is located outdoors, in areas with public access, or in correctional facilities, frame work shall be lined with minimum 3/8" thickness fire rated plywood sheathing. Sheathing shall be caulked or taped airtight at all joints and seams.

(3) Interior walls shall be covered with two layers of fire retardant 6-mil polyethylene sheeting, with a minimum overlap of 12 inches at seams. Seal seams airtight using tape and adhesive. The interior floor shall be covered with two (2) layers of reinforced fire-retardant polyethylene sheeting with a minimum overlap on the walls of twelve inches.

(4) Entrances to the decontamination unit shall be secured with lockable hinged doors. Doors shall be open at all times when abatement operations are in progress. Doors shall be louvered to allow for air movement through the decontamination units into the Work Area.

b. Curtained Doorways: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

c. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart.

d. Decontamination Enclosure System shall be located outside the work area and attached to all locations through which ACM waste will be removed from the work area and shall consist of two totally enclosed chambers, separated from the Work Area and each other by airlocks, as follows:

(1) Washroom: An equipment washroom shall have two air locks (one separating the unit from the Work Area and one common air lock that separates it from the holding area). The washroom shall have facilities for washing material containers and equipment. Gross removal of dust and debris from contaminated material containers and equipment shall be accomplished in the Work Area, prior to moving to the washroom.

(2) Holding Area: A holding area shall share a common air lock with the equipment washroom and shall have a curtained doorway to outside areas. A hinged, lockable door shall be placed at the holding area entrance to prevent unauthorized access into the Work Area.

B. Small Asbestos Project:

1. The worker decontamination enclosure system shall consist of, as a minimum, an equipment room, a shower room, and a clean room separated from each other and from the work area by curtained doorways. The equipment storage, personnel gross decontamination and removal of disposal clothing shall occur in the equipment room prior to entering the shower. All other requirements shall be the same as described above for a large asbestos project.

2. For small asbestos projects with only one exit from the work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage. All other requirements shall be the same as described above for a large asbestos project.

C. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Asbestos abatement contractor, and as specified herein.

3.03 PERSONNEL ENTRANCE AND DECONTAMINATION PROCEDURES FOR REMOVAL OPERATIONS UTILIZING REMOTE DECONTAMINATION FACILITIES

A. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall fully identify the facility, agents, asbestos abatement contractor(s), the project, each Work Area, and worker respiratory protection employed. The job supervisor shall be responsible for the maintenance of the log during the abatement activity. The log shall be submitted to the NYC DDC within 48 hours of request.

B. Each worker shall remove street clothes in the clean room; wear two disposable suits, including gloves, hoods and non-skid footwear; and put on a clean respirator (with new filters) before entering the Work Area.

C. Each worker shall, before leaving the Work Area or tent, clean the outside of the respirators and outer layer of protective clothing by wet cleaning and/or HEPA-vacuuming. The outer disposable suit shall be removed in the airlock prior to proceeding to the Worker Decontamination Unit. The inner disposable suit and respirator shall be wet wiped and HEPA vacuumed thoroughly before removing and prior to aggressive shower.

D. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately.

3.04 PERSONNEL ENTRANCE AND DECONTAMINATION PROCEDURES FOR REMOVAL OPERATIONS UTILIZING ATTACHED DECONTAMINATION FACILITIES

A. All workers and authorized visitors shall enter the Work Area through the worker decontamination facility.

B. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, asbestos abatement contractor(s), the project, each Work Area and worker respiratory protection employed. The site supervisor shall be responsible for the maintenance of the log during the abatement activity. The log shall be submitted to the NYC DDC within 48 hours of request.

C. Each worker or authorized visitor shall, upon entering the job site, remove street clothes in the clean room and put on a clean respirator with filters, and clean protective clothing before entering the Work Area through the shower room and equipment room.

D. Each worker or authorized visitor shall, each time he leaves the Work Area, remove gross contamination from clothing before leaving the Work Area; proceed to the equipment room and remove clothing except the respirator; still wearing the respirator, proceed to the shower room; clean the outside of the respirator with soap and water while showering; remove filters, wet them, and dispose of them in the container provided for that purpose; wash and rinse the inside of the respirator; and thoroughly shampoo and wash himself/herself.

E. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately. Disposable clothing of the type worn inside the Work Area is not permitted outside the Work Area.

3.05 MAINTENANCE OF DECONTAMINATION ENCLOSURE FACILITIES AND BARRIERS

The following procedures shall be followed during abatement activities.

A. All polyethylene barriers inside the work place and partitions constructed to isolate the Work Area from occupied areas shall be inspected by the asbestos handler supervisor at least twice per shift.

B. Smoke tubes shall be used to test the integrity of the Work Area barriers and the decontamination enclosure systems daily before abatement activity begins and at the end of each shift.

C. Damage and defects in the decontamination enclosure system shall be repaired immediately upon discovery. The decontamination enclosure system shall be maintained in a clean and sanitary condition at all times.

D. At any time during the abatement activity, if visible emissions are observed, or elevated asbestos fiber counts outside the Work Area are measured, or if damage occurs to barriers, abatement shall stop. The source of the contamination shall be located, the integrity of the barriers shall be restored and extended to include the contaminated area, and visible residue shall be cleaned up using appropriate HEPA-vacuuming and wet cleaning.

E. Inspections and observations shall be documented in the daily project log by the asbestos handler supervisor.

F. The daily inspection to ensure that exits have been checked against exterior blockage or impediments to exiting shall be documented in the log book. If exits are found to be blocked, abatement activities shall stop until the blockage is cleared.

3.06 MODIFICATIONS TO HVAC SYSTEMS

A. Shut down, isolate or seal, all existing HVAC units, fans, exhaust fans, perimeter convection air units, supply and/or return air ducts, etc., situated in, traversing or servicing the work zone.

B. Seal all seams with duct tap. Wrap entire duct with a minimum of two layers of fire retardant 6-mil polyethylene sheeting. All shutdowns are to be coordinated with the Facility. Where systems must be maintained, i.e., traversing Work Areas to non-Work Areas, only supply ducts will be maintained, protect as described above. All returns must be blanked off in Work Area and adjacent areas, including floor above and below Work Area. When required Asbestos abatement contractor shall apply for a clarification from NYCDEP. The Asbestos abatement contractor shall implement the following engineering procedures:

1. Maintenance of a positive pressure within the HVAC system of 0.01 inch water gauge (or greater) with respect to the ambient pressure outside the Work Area. The conditions for this system shall be maintained and be operational 24 hours per day from the initiation of Work Area preparation until successful final air clearance. Positive pressurization of HVAC system shall be applied only under the direction and control of professional engineer, or other knowledgeable licensed professional;

2. The positive pressurization of the duct shall be tested, inspected and recorded both at the beginning and at the end of each shift;

3. The positive pressurization shall be monitored using instrumentation which will provide a written record of pressurization and that will trigger an audible alarm, if the static pressure falls below the set value;

4. The supply air fan and the supply air damper for the active positive-pressurized duct shall be placed in the manual "on" positions to prevent shutdown by fail-safe mechanisms;

5. The return air fan and the return air dampers shall be shut down and locked-out;

6. All the seams of the HVAC ducts that pass through the Work Area shall be sealed;

7. The HVAC ducts that pass through the Work Area shall be covered with two (2) layers of fire retardant 6-mil polyethylene sheeting, and all seams and edges of both layers shall be sealed airtight;

8. The supply air fans, return air fans, and all dampers servicing the Work Area itself shall be shut down and locked-out. All openings within the Work Area of supply and return air ducts shall be sealed with 3/8-inch fire rated plywood and two layers of fire retardant 6-mil polyethylene;

9. When abatement occurs during periods while the HVAC system is shut down an alternative method of pressurization of the duct passing through the Work Area should be employed (e.g., by low-pressure "blowers", etc., directly coupled into the duct). Item #4 above shall be deleted and shall be replaced by the requirement to set the dampers of the HVAC duct in the manual closed positions, in order to effect pressurization.

C. Asbestos abatement contractor to coordinate this item with the Facility and Construction Project Manager at the commencement of work. Where present HVAC systems (ducts) service an area and that air system cannot be shut down, asbestos abatement contractor shall isolate and seal the ducts, both supply and return, at the boundary of that zone.

1. To isolate, cap, or seal a duct, the asbestos abatement contractor shall remove insulation from duct (if necessary), then disconnect linkage to fold shut all fire dampers. Asbestos abatement contractor shall seal all edges and seams with caulk and duct-tape.

2. Asbestos abatement contractor shall then cut existing duct and fold metal in and secure with approved fasteners. Asbestos abatement contractor shall caulk and duct-tape all seams and edges.

3. All ducts shall then be completely wrapped and sealed with duct-tape and three (3) layers of reinforced polyethylene sheeting.

4. All ducts shall be restored to original working order at the end of the project.

D. Where present HVAC systems (ducts) service occupied areas (non-Work Areas), the Asbestos abatement contractor shall blank off the ducts.

1. To isolate or seal the return duct, the asbestos abatement contractor shall remove any insulation (if necessary) from the duct. Then disconnect linkage to fold shut all fire dampers and insert a fiberglass board within the duct. Asbestos abatement contractor shall seal all edges and seams with caulk, duct-tape and three (3) layers of reinforced polyethylene sheeting.

2. All isolation of return ducts and any other activity that requires removal of ceiling by the asbestos abatement contractor shall be conducted under controls. Work is to be coordinated with the Construction Project Manager and the Facility and is described as follows:

a. Work shall occur as scheduled.

b. Horizontal surfaces near the blanking operations shall be protected with fire retardant 6-mil polyethylene sheeting.

c. Plastic drapes shall be used to enclose the immediate area.

d. Asbestos abatement contractor to position and operate air filtration devices and HEPA-vacuums in the area to clean space after blanking operations.

e. All personnel involved with this work shall receive personal protection (i.e., respirators and disposable suits).

E. Upon loss of negative pressure or electric power, all work activities in an area shall cease immediately and shall not resume until negative pressure and/or electric power has been fully restored. When a power failure or loss of negative pressure lasts, or is expected to last, longer than thirty (30) minutes, the following sequence of events shall occur.

1. All make up air inlets shall be sealed airtight.

2. All decontamination facilities shall be sealed airtight after evacuation of all personnel from the Work Area.

3. All adjacent areas shall be monitored for potential fiber release upon discovery of and subsequently throughout, power failure.

3.07 LOCKOUT OF HVAC SYSTEMS, ELECTRIC POWER, AND ACTIVE BOILERS

Prior to the start of any prep work, the asbestos abatement contractor shall employ skilled tradesmen with limited asbestos licenses for the following work:

A. Disable all ventilating systems or other systems bringing air into or exhausting air out of the Work Area. Disable system by disconnecting wires removing circuit breakers, by lockable switch or other positive means to ensure against accidental re-starting of equipment.

B. Lock out power to the Work Area by switching off all breakers and removing them from panels or by switching and locking entire panel. Label panel with following notation: "DANGER CIRCUIT BEING WORKED ON". Give all keys to Facility.

C. Lock out power to circuits running through Work Area whenever possible by switching off and removing breakers from panel. If circuits must remain live, the Facility shall notify asbestos abatement contractor in order that he may secure a variance from NYCDEP. The asbestos abatement contractor shall protect all conduit and wires to remain and label all active circuits at intervals not to exceed 3 feet with tags having the following notation: "DANGER LIVE ELECTROCUTION HAZARD". The asbestos abatement contractor shall label all circuits in all locations including hidden locations that may be affected by the work in a similar manner.

D. All boilers and other equipment within the work area shall be shut down, locked out, tagged out and the burner/boiler/equipment accesses and openings shall be sealed until abatement activities are complete. If the boiler or other exhausted equipment will be subject to abatement, all breeching, stacks, columns, flues, shafts, and double-walled enclosures serving as exhausts or vents shall be segregated from the affected boiler or equipment and sealed airtight to eliminate potential chimney effects within the work area.

PART 4 – PREPARATION OF WORK AREA AND REMOVAL PROCEDURES

4.01 REMOVAL OF ASBESTOS-CONTAINING MATERIAL

A. Asbestos abatement contractor Responsibility

Asbestos abatement contractor shall be responsible for the proper removal of ACM from the Work Area using standard industry techniques. The Third-Party Air Monitor representative shall observe the Work.

1. General Requirements:

a. Removal of ACM shall be performed using wet methods. Dry removal of ACM is prohibited.

b. Spray ACM with amended water with sufficient frequency and quantity to enhance penetration. Sufficient time shall be allowed for amended water to penetrate the material to the substrate prior to removal. All ACM shall be thoroughly wetted while work is being conducted.

c. Accumulation of standing water on the floor of the Work Area is prohibited.

d. Apply removal encapsulants, when used, in accordance with the manufacturer's recommendations and guidelines.

e. Containerize ACM immediately upon detachment from the substrate. Alternately, ACM may be dropped in to a flexible catch basin and promptly bagged. Detached ACM is not permitted to lie on the floor for any period of time. Excess air within the bag shall be removed before sealing. ACM shall not be dropped from a height of greater than 10 feet. Above 10 feet, dust free inclined chutes may be used. Maximum inclination from horizontal shall be 60-degrees for all chutes.

f. Exits from the work area shall be maintained, or alternative exits shall be established, in accordance with section 1027 of the New York City Fire Code. Exits shall be checked at the beginning and end of each work shift against blockage or impediments to exiting.

g. Signs clearly indicating the direction of exits shall be maintained and prominently displayed within the work area.

h. No smoking signs shall be maintained and prominently displayed within the work place.

i. At least one fire extinguisher with a minimum rating 2-A:10-B:C shall be required for each work place. In the case of large asbestos projects, at least two such fire extinguishers shall be required.

j. If the containment area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell, or at a secured location in the ground floor lobby when conditions warrant. The required switch or switches shall be installed by a licensed electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation

equipment is used on multiple floors the cut off switch shall be able to turn off the equipment on all floors.

B. Removal of ACM Utilizing Full Containment Procedures shall be as follows:

1. Preparation Procedures:

a. Ensure that the Third-Party Air Monitor has performed area monitoring and established a background count prior to the preparatory operations for each removal area, as applicable.

b. Shut down, isolate, and lock out or tag heating, ventilating, and air conditioning (HVAC) systems which serve or which pass through the Work Area. Vents within the Work Area and seams in HVAC components shall be sealed with tape and two layers of fire retardant polyethylene sheeting. Filters in HVAC systems shall be removed and treated as asbestos-asbestos contaminated waste.

c. Shut down, disconnect, and lock out or tag all electric power to the Work Area so that there is no possibility of its reactivation until after clearance testing of the Work Area.

d. Provide and install decontamination enclosure systems in accordance with Sections 3.01 and 3.02 of this Section.

e. Remove ACM that may be disturbed by the erection of partitions using tent procedures and wet removal methods. Removal shall be limited to a one-foot wide strip running the length/height of the partition.

f. Pre-clean and remove moveable objects from the Work Area. Pre-cleaning shall be accomplished using HEPA-vacuum and wet-cleaning techniques. Store moveable objects at a location determined by the City.

g. Protect carpeting that will remain in the Work Area.

(1) Pre-clean carpeting utilizing wet-cleaning techniques.

(2) Install a minimum of two layers of fire retardant 6-mil reinforced polyethylene sheeting over carpeting.

(3) Place a rigid flooring material, minimum thickness of 3/8-inch, over polyethylene sheeting.

h. Pre-clean all fixed objects to remain within the Work Area using HEPA-vacuum and wet-cleaning techniques.

i. Seal fixed objects with two individual layers, minimum, of 6-mil fire retardant polyethylene sheeting.

j. Pre-clean entire Work Area utilizing HEPA-vacuum and wet-cleaning techniques. Methods of cleaning that raise dust; such as dry sweeping or use of vacuum equipment not equipped with HEPA-filters, is prohibited.

k. Install isolation barriers (i.e., sealing of all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffusers, and other penetrations within the Work Area) using two layers of 6-mil fire retardant polyethylene sheeting and duct-tape.

l. Construct rigid framework to support Work Area barriers.

(1) Framework shall be constructed using 2-inch by 4-inch wooden or metal studs placed 16 inch on center when existing walls and/or ceiling do not exist for all openings greater than 32 square feet. Framework is not required except where one dimension is one foot or less or the opening will be used as an emergency exit.

(2) Apply a solid construction material, minimum thickness of 3/8-inch to the Work Area side of the framing. In secure interior areas, not subject to access from the public or building occupants, an additional layer of 6-mil fire retardant polyethylene sheeting may be substituted for the rigid construction material.

(3) Caulk all wall, floor, ceiling, and fixture joints to form a leak tight seal.

m. Seal floor drains, sumps, shower tubs, and other collection devices with two layers of 6-mil fire retardant plastic and fire rated plywood, as necessary, and provide a system to collect all water used by the asbestos abatement contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.

n. Remove ceiling mounted objects not previously sealed that will interfere with removal operations. Mist object and surrounding ACM with amended water prior to removal to minimize fiber dispersal. Clean all moveable objects using HEPA-vacuum and wet-cleaning techniques prior to removal from the Work Area.

o. Fiberglass insulation with intact coverings shall be protected in place during abatement activities. These materials shall be protected with two layers of 6-mil fire retardant polyethylene sheeting as isolation barriers and two additional layers of 6-mil fire retardant polyethylene sheeting serving as primary and secondary surface barriers.

p. Install and initiate operation of AFDs to provide a negative pressure and a minimum of four air changes per hour within the Work Area relative to surrounding non-Work Areas. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures. The use of HEPA-filtered vacuum to produce a negative air pressure inside the enclosure is prohibited.

q. Maintain emergency and fire exits from the Work Areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with florescent paint or other effective designations to permit easy location from anywhere within the Work Area. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.

r. Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.

s. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation.

t. Prior to being plasticized, the Work Areas shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be used.

u. Plasticize the area after pre-cleaning, using the following procedures.

(1) Cover floors with one layer of 6-mil fire retardant polyethylene sheeting, turning layer a minimum of 6 inches up wall, and seal layer to wall.

(2) Cover walls with one layer of 6-mil fire retardant polyethylene sheeting, overlapping wall layer a minimum of 6 inches, and seal layer to floor layer.

(3) Cover floors with a second layer of 6-mil fire retardant polyethylene sheeting, turning layer a minimum of 12 inches up wall, and seal layer to wall.

(4) Cover walls with a second layer of fire retardant 6-mil polyethylene sheeting, overlapping wall layer a minimum of 12 inches, and seal layer to floor layer.

(5) In areas where demolition is required to access ACM, a layer of fire retardant 6-mil reinforced polyethylene sheeting shall be placed on the floor of the enclosure.

(6) Perform demolition required to access ACM. Debris resulting from demolition activities shall be disposed of as ACM waste as described in this Specification.

(7) Repeat preparation of areas accessed by demolition activities as described above.

v. Suspended ceiling tiles and T-grid components shall remain in place until the preparation of the Work Area below the ceiling tiles are completed and personnel and equipment decontamination enclosures have been constructed.

w. Scaffolds shall be provided for workers engaged in work that cannot safely be performed from the ground or other solid Work Area surface.

x. Means of egress shall not be obstructed by hardwall barriers.

y. Pre-Removal Inspections.

(1) Prior to removal of any ACM, the asbestos abatement contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Within Full Containment:

a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.

b. Remove the material using hand tools such as scrapers or putty knives. Wire-mesh or wood lathe reinforcing, when present, shall be cut into manageable pieces and disposed of as ACM.

c. Remove any residual material from the substrate using wet cleaning methods and nylon-bristled hand brushes.

d. Place the removal material immediately into a properly labeled fire retardant 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.

e. Following the completion of removal of insulation, all visible residue shall be removed from the substrate.

3. Following Removal of ACM utilizing Full Containment Procedures:

a. First Cleaning:

(1) Remove any visible accumulation of asbestos material and debris. HEPA-vacuuming and wet cleaning shall be performed on all surfaces inside the Work Area. All sealed drums, plastic bags, and equipment used in the Work Area shall be removed from the Work Area.

(2) Upon request of the asbestos abatement contractor, the Third-Party Air Monitor will perform a visual inspection. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.

(3) Remove first layer of plastic sheathing inside the Work Area. The isolation barriers and decontamination facility shall remain in place and be utilized.

b. Second Cleaning:

(1) After the first cleaning, the Work Area shall be vacated for twelve hours to allow fibers to settle.

(2) All objects and surfaces in the Work Area shall be HEPA - vacuumed and wet cleaned for a second cleaning.

(3) A thin coat of lockdown encapsulant shall be applied to all plastic covered surfaces in the Work Area.

(4) When the encapsulant is dry, second layer of polyethylene sheeting on the walls, ceiling and floors shall be removed. Do not remove seals from doors, windows, Isolation Barriers or disconnect the negative pressure equipment.

c. Third Cleaning:

(1) A minimum of four hours after the second cleaning, all the surfaces in the Work Area shall be HEPA-vacuumed and wet cleaned for a third cleaning.

(2) Upon the request of the asbestos abatement contractor, the Third-Party Air Monitor will do final visual inspection for re-occupancy. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.

(3) When the Work Area passes the Third-Party Air Monitor's visual re-occupancy inspection, air sampling shall not begin until at least one hour after the completion of the third cleaning. The Third-Party Air Monitor shall perform air monitoring using aggressive testing techniques. The Third-Party Air Monitor will approve re-occupancy if the specified fiber count in the Work Area is achieved according to the Third-Party Air Monitor.

(4) When the Work Area passes the re-occupancy test, all controls and seals established shall be removed.

(5) The cleaned layer of the surface barriers shall be removed from walls and floors.

(6) The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

d. Final Barrier Removal:

(1) Upon receipt of acceptable clearance testing results, polyethylene sheeting and Isolation Barriers shall be removed and disposed accordingly as asbestos-containing material.

(2) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.

e. The Third-Party Air Monitor will conduct a final visual observation. Approval must be granted prior to break down of decontamination facility and asbestos abatement contractor demobilization.

C. Removal of ACM utilizing NYCDEP Title 15, Chapter 1 §1-106 Tent Containment Procedures and/or Tent and Glove-bag Procedures utilizing NYDEP Title 15, Chapter 1 §1-105 shall be as follows:

1. Preparation Procedures:

a. Ensure that the Third-Party Air Monitor has performed area monitoring and established a background count prior to the preparatory operations for each removal area, as applicable.

b. Shut down, isolate, and lock out or tag heating, ventilating, and air conditioning (HVAC) systems which serve or which pass through the Work Area. Vents within the Work Area and seams in HVAC components shall be sealed with tape and two layers of polyethylene sheeting. Filters in HVAC systems shall be removed and treated as asbestos-asbestos contaminated waste.

c. Shut down, disconnect, and lock out or tag all electric power to the Work Area so that there is no possibility of its reactivation until after clearance testing of the Work Area.

d. Provide and install decontamination enclosure systems in accordance with PART 3 - EXECUTION, Sections 3.01 and 3.02 of these Specifications. Decontamination facilities may be remote from the Work Areas.

e. Construct rigid framework to support Work Area barriers. Framework shall be constructed using 2-inch by 4-inch wooden or metal studs placed 16 inch on center when existing walls and/or ceiling do not exist.

f. Seal floor drains, sumps, shower tubs, and other collection devices with two layers of fire retardant 6-mil plastic and minimum 3/8" fire rated plywood, as necessary, and provide a system to collect all water used by the asbestos abatement contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer. Any opening greater than 32 square feet shall be framed with 2-inch by 4-inch studding placed 16 inches on center.

g. Install and initiate operation of AFDs to provide a negative pressure and a minimum of four air changes per hour and negative pressure of -0.02" of water column within the Work Area relative to surrounding non-Work Areas. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures. The use of HEPA-filtered vacuums to produce a negative air pressure inside the enclosure is prohibited.

h. Maintain emergency and fire exits from the Work Areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with florescent paint or other effective designations to permit easy location from anywhere within the Work Area. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.

i. Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.

j. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacture equipped with HEPA filtered local exhaust ventilation.

k. Prior to being plasticized, the Work Areas shall be cleaned using HEPA-vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be used.

l. There shall be an airlock at the entrance to the tent, unless there is an attached worker or waste decontamination system.

m. Plasticize the area after pre-cleaning, using the following procedures. Do not apply polyethylene sheeting to the wall and ceiling surfaces that will be demolished to access ACM.

(1) Cover floor with one layer of fire retardant 6-mil polyethylene sheeting, turning layer a minimum of 12 inches up wall, and seal layer to wall.

(2) Cover walls with one layer of fire retardant 6-mil polyethylene sheeting, overlapping wall layer a minimum of 12 inches, and seal layer to floor layer.

(3) Cover ceilings with one layer of fire retardant 6-mil polyethylene sheeting, overlapping wall layer a minimum of 12 inches, and seal layer to wall layer.

(4) Repeat procedure for second layer. All joints in polyethylene sheeting shall be glued and taped in such a manner as to prohibit air passage. Joints on plastic layers shall be staggered to reduce the potential for water to penetrate.

(5) In areas where demolition is required to access ACM, a layer of fire retardant 6-mil reinforced polyethylene sheeting shall be placed on the floor of the enclosure.

(6) Perform demolition required to access ACM. Debris resulting from demolition activities shall be disposed of as ACM as described in this Specification.

(7) Repeat preparation of areas accessed by demolition activities as described above.

(8) Suspended ceiling tiles and T-grid components shall remain in place until the preparation of the Work Area below the ceiling tiles are completed and personnel and equipment decontamination enclosures have been constructed.

(9) Protect non-ACM insulation within the Work Area(s) with two individual layers of fire retardant 6-mil polyethylene sheeting. Sheeting shall remain in-place until satisfactory clearance air monitoring results are achieved.

n. Installation of glove-bags for removal of thermal system insulation, when required:

(1) General: Glove-bag operations shall be performed using commercially available glove-bags of at least fire retardant 6-mil, transparent plastic appropriately sized for the diameter of the material to be removed. The use of "moveable" glove-bag techniques is strictly forbidden. At no time, shall the glove-bag be sized to allow for the removal of more than three linear feet

of insulation. Glovebag procedures may only be used in conjunction with full containment of the work area or the tent procedure.

(2) Place the necessary tools and materials inside of the tool pouch of the glove-bag before the glove-bag procedure begins.

(3) Place duct-tape securely around the affected area to form a smooth area to which the glove-bag can be securely fastened.

(4) Attach glove-bag to the cable, wire or pipe. Seal top of glove-bag by double folding and stapling. Place duct-tape along the seam to form an airtight seal. Seal sides of glove-bag, where cable, wire or pipe passes through, with duct-tape to form an airtight seal.

(5) If the material adjacent to the work section is damaged, terminates, is jointed or contains an irregularity, wrap the section in two layers of 6-mil fire retardant polyethylene sheeting and seal airtight with duct-tape.

(6) Smoke test each glove-bag as indicated below. The Third-Party Air Monitor shall be present during all smoke testing.

(7) The glovebag shall be placed under negative pressure utilizing a HEPA vacuum, and a smoke tube shall then be aspirated to direct smoke at all seams and seals from outside the glovebag. Any leaks detected by the smoke test shall be duct taped airtight.

(8) All necessary tools and materials shall be brought into the work area before the glovebag procedure begins.

(9) Glovebag procedures shall be conducted by workers specifically trained in glovebag procedures and equipped with appropriate personal protective equipment.

(10) The insulation diameter worked shall not exceed one half the bag working length above the attached gloves.

o. Glovebag procedures shall be conducted by workers specifically trained in glovebag procedures and equipped with appropriate personal protective equipment.

p. Pre-Removal Inspections

(1) Prior to removal of any ACM, the Asbestos abatement contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Thermal Insulation Using Glove-Bag Techniques:

a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.

b. Remove the insulation using hand tools such as knives or scissors.

c. Exercise caution when removing insulation.

d. Remove any residual asbestos-containing insulation from the substrate using wet cleaning methods and nylon-bristled hand brushes.

(1) Any insulation ends created by this procedure shall be sealed with encapsulant prior to bag removal or thoroughly wetted before bag removal and sealed with wettable cloth end caps and spray glue or any combination of these materials immediately following bag removal.

(2) The tool pouch shall be separated from the bag prior to disposal by twisting it and the wall to which it is attached several times, and taping the twist to hold it in place, thus sealing the bag and the pouch which are severed at the midpoint of the twist. Alternatively, the tools can be pulled through with one or both glove inserts, thus turning the gloves inside out. The glove(s) is/are then twist sealed forming a new pouch, taped and several mid-seal forming two separate bags.

(3) A HEPA vacuum shall be used for evacuation of the glovebag in preparation for removal of the bag from the surface for clean-up in the event of a spill, and for post project clean-up.

(4) With the glovebag collapsed and the ACM in the bottom of the bag, the bag shall be twisted several times and taped to seal that section during bag removal.

(5) A 6-mil plastic bag shall be slipped around the glovebag while it is still attached to the surface. The bag shall be detached from the surface by removing the tape or cutting the top with blunt scissors.

(6) The asbestos-containing waste, the clean-up materials, and protective clothing shall be wetted sufficiently, double-bagged minimizing air content, sealed separately, and disposed of in conformance with applicable regulations.

3. Removal of ACM Utilizing Tent Containment Procedure:

a. Tent procedures shall be limited to the removal of less than 260 linear feet and 160 square feet of ACM and shall not result in disturbance of ACM during tent erection.

b. Mist material with amended water and/or foam. Allow sufficient time for the amended water to penetrate the material to be removed.

c. Cut bands, wire or other items placed over insulation or ACM.

d. Remove the ACM using hand tools such as knives or scrapers.

e. Exercise caution when removing ACM.

f. Remove any residual asbestos-containing material from the substrate using wet cleaning methods.

g. Seal exposed ends of remaining insulation or ACM with a "wettable cloth" and/or encapsulant.

h. Place the removed material immediately into a properly labeled fire retardant 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.

i. Following the completion of removal of ACM, all visible residue shall be removed from the substrate.

4. Following Removal of ACM Utilizing Tent Containment or Tent/Glovebag Procedure:

a. Clean all visible accumulations of loose ACM. Metal shovels shall not be used within the Work Area.

b. Accumulations of dust shall be cleaned continuously until completion of clean up.

c. After removal of all visible accumulations of ACM, the area shall be:

(1) Wet cleaned using rags, mops or sponges.

(2) Permitted sufficient time to dry, prior to HEPA vacuuming all substrates.

(3) Lightly encapsulated to lockdown residual asbestos. A thin coat of an encapsulating agent shall be applied to any surfaces in the Work Area which were not the subject of removal or other remediation activities. In no event shall encapsulant be applied to any surface that was the subject of removal or other remediation activities prior to obtaining satisfactory clearance air monitoring results. Asbestos abatement contractor shall request and pass a visual inspection performed by the consultant before proceeding to the next step. Documentation of passing this inspection shall be recorded in a daily logbook.

(4) The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.

(5) If the Work is accepted by the Third-Party Air Monitor based on the inspection, asbestos abatement contractor shall be notified. Conduct the following activities in accordance with the contract and all applicable laws, codes, rules and regulations.

(a) All waste shall be removed from the Work Area and holding areas.

(b) All tools and equipment are to be removed and decontaminated in the decontamination enclosure system.

(6) If the Work is not approved, the Third-Party Air Monitor will inform Asbestos abatement contractor who will then HEPA-vacuum and/or wet-clean the Work Area. The Third-Party Air Monitor will then perform a subsequent visual observation. This process will continue until the Third-Party Air Monitor accepts the Work Area as clean.

(7) The Work Area shall be vacated for a minimum of one hour to allow fibers to settle prior to clearance air monitoring, when required.

d. Final Barrier Removal

(1) Upon receipt of acceptable clearance testing results polyethylene sheeting (inside layers) and Isolation Barriers shall be removed and disposed accordingly as ACM. The tent shall be collapsed inward, enclosing the contaminated clothing. This contaminated material shall be disposed of in another plastic bag. The HEPA vacuum shall be decontaminated and sealed.

(2) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA-vacuum and wet methods.

e. The Third-Party Air Monitor will conduct a final visual inspection. Approval must be granted prior to break down of decontamination facility and asbestos abatement contractor demobilization. Other Information: Extra time required to clean Work Areas in order to achieve clearance criteria shall not be considered grounds for an extension of time for contract completion.

D. Removal of ACM from Vertical Exterior Surfaces utilizing NYCDEP Title 15, Chapter 1 §1-109 Abatement from Vertical Exterior Surfaces procedures shall be as follows:

Preparation procedures: This procedure shall apply to the abatement of asbestos-containing materials from vertical exterior surfaces such as, but not limited to caulking or glazing compounds, asphaltic materials or tar, cement siding or shingles (including transite), paints, sealants coping stone caps or clay roof tiles.

a. The entire surface to be abated and ground-level perimeter shall be considered the work area unless partitions and warning tape are used to define the work area.

b. A restricted area shall be established using warning tape extending at least 25 feet from the affected areas of the building or to the nearest vertical obstruction or the curb.

c. The restricted area may be entered only by certified workers or authorized visitors.

d. Before plasticizing, the restricted area shall be inspected for ACM debris and, if necessary, pre-cleaned using HEPA vacuums and wet methods.

e. All openings to the building or structure's interior which are within 25 feet of the affected ACM shall be closed and sealed.

f. Scaffolding erected to access the ACM shall be constructed, maintained, and used in accordance with applicable federal, state, and city laws.

g. Horizontal surfaces beneath the affected ACM shall be covered with two layers of fire-retardant 6-mil plastic to a width of six feet.

h. Elevated platforms being used to access the affected ACM shall be plasticized with two layers of fire-retardant 6-mil plastic, which shall extend up from the platform to at least the height of the mid-rail on three sides, and shall be attached directly to the building just below the surfaces under abatement.

i. The ground-level restricted area shall be cleared of all moveable objects and plasticized with two sheets of fire-retardant 6-mil plastic, which shall be extended one foot up the side of the building. The plasticized area shall be ten feet wide for every floor up to a maximum width of thirty feet, or to the curb. This plastic shall be cleaned, replaced, and disposed of as asbestos waste at the end of each shift.

j. Sidewalk bridges in the restricted area shall be covered with two layers of fire retardant 6-mil plastic, placed over and secured to the bridge, spread across the full width, draped over the side to ground level, and extended to a width of at least thirty feet.

k. Establish a remote decontamination unit in accordance with Section 3.01 within the restricted area.

l. Construct all elevated work platforms a minimum of one foot below the surface to be abated.

m. Pre-Removal Inspections

(1) Prior to removal of any ACM, the asbestos abatement contractor shall notify the Project Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Project Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Materials:

a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.

b. Remove the caulk using hand tools such as knives or scrapers.

c. Exercise caution when removing caulking material to prevent damage to windows or skylight openings.

d. Remove any residual asbestos-containing caulking material from the substrate using wet cleaning methods and nylon-bristled hand brushes. The use of metal bristled brushes is prohibited.

e. Place the removed material immediately into a properly labeled 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.

f. Following the completion of removal of caulking, all visible residues shall be removed from the substrate.

g. Air sampling shall be conducted in compliance with NYC DEP Title 15 Chapter 1, §1-41 Air Sampling Schedule. This sampling shall be performed by the Third Party Air Monitoring Firm.

3. Following Removal of ACM :

a. The stripped substrate shall be HEPA vacuumed and wet-wiped.

b. A visual clearance inspection shall be conducted by the asbestos handler supervisor and project monitor after the work area dries, to ensure the absence of ACM residue or debris in the work area.

c. After the inspection is completed, the warning tapes and barriers may be removed.

d. The clearance inspection shall be documented in the log and the project air sampling log.

e. Air monitoring shall be conducted in accordance with relevant provisions.

f. Asbestos abatement contractor shall request and pass a visual inspection performed by the consultant before proceeding to the next step. Documentation of passing this inspection shall be recorded in a daily logbook.

g. The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.

h. If the Work is accepted by the Third-Party Air Monitor based on the inspection, asbestos abatement contractor shall be notified. Conduct the following activities in accordance with the contract and all applicable laws, codes, rules and regulations:

(1) All waste shall be removed from the Work Area and holding areas.

(2) All tools and equipment are to be removed and decontaminated in the decontamination enclosure system.

i. If the Work is not approved, the Third-Party Air Monitor will inform Asbestos abatement contractor who will then HEPA-vacuum and/or wet-clean the Work Area. The Third-Party Air Monitor will then perform a subsequent visual observation. This process will continue until the Third-Party Air Monitor accepts the Work Area as clean.

j. Final Barrier Removal

(1) Upon receipt of acceptable observation results, polyethylene sheeting and barrier tape shall be removed and disposed accordingly as ACM.

(2) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.

(3) The Third-Party Air Monitor will conduct final visual inspection. Approval must be granted prior to break down of decontamination facility and asbestos abatement contractor demobilization. Other Information: Extra time required to clean Work Areas in order to achieve clearance criteria shall not be considered grounds for an extension of time for contract completion.

E. Removal of ACM Roofing and Flashing Materials utilizing NYC DEP § 1-107 Foam Procedure for Roof Removal shall be as follows:

1. Preparation procedures:

a. These procedures apply only to the removal of asbestos-containing roofing material (ACRM) from exterior roof surfaces. The work area on the roof shall be cordoned off with clearly visible barriers such as caution tape, and only authorized persons shall have access.

b. The foam or viscous liquid shall be non-toxic, shall not require special respiratory protection for handling, and shall not affect the handling and disposal of the waste.

c. The foam or viscous liquid shall coat and maintain a stable blanket (minimum 1" thickness) for the duration of the removal process and shall leave an identifiable colored residue when it dissipates.

d. The foam or viscous liquid shall wet the ACRM. The ACRM shall be kept wet through the bagging process.

e. Persons entering the work area shall wear correctly-fitting, good traction rubber boots.

f. Abatement shall not be carried out during adverse weather conditions (e.g., precipitation, high winds, ambient temperature below 32 degrees Fahrenheit, etc.).

g. The worker decontamination unit may be attached to each work area at an entry/exit from each work area, or may be remote, in which case it shall be equipped with an airlock at the entrance. In addition to the shower head(s), the shower room shall be equipped with a flexible hose for waste decontamination for removal of less than 1,000 square feet of ACRM. For 1,000 square feet or more of ACRM removal, a separate waste decontamination facility shall be located at an entry/exit from each work area. Remote holding areas for the asbestos containing waste shall comply with Title 16, Chapter 8, Rules of the City of New York (16 RCNY 8 et. seq.).

h. Movable objects shall be removed from the work area, or kept in place and wrapped in one sheet of fire retardant 6 mil plastic sheeting.

i. Provisions shall be made to ensure a safe and adequate air supply to affected building(s). All vents, skylights, air intakes, windows and doors opening onto the roof, and all other openings shall be sealed with 2 layers of fire retardant 6 mil plastic or fitting with HEPA filters when appropriate. Temporary extensions may be installed to a

height of 10 feet to ensure adequate air exchange instead of sealing vents, air intakes, etc., with 2 layers of plastic or HEPA filters. Drains may be equipped with 5 micron filtering system in lieu of being sealed.

j. Fixed objects including perimeter walls, bulkheads, cooling towers, ducts and other rooftop appurtenances shall be covered in one sheet of fire retardant 6 mil plastic up to a height of at least six feet.

k. THE ASBESTOS ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF THE INTERIOR SPACES BENEATH THE ROOF.

l. All office equipment and furniture, including but not limited to desks, chairs, computers, printers, cabinets, etc., carpeted and wooden floors shall be covered with one layer of 6- mil plastic sheeting.

m. THE ASBESTOS ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE THAT MAY OCCUR IN THE INTERIOR SPACES, INCLUDING BUT NOT LIMITED TO OFFICE EQUIPMENT, FURNITURE, FLOORS, ETC., BENEATH THE ROOF DURING ALL PHASES OF THE ROOF ABATEMENT.

n. The asbestos abatement contractor shall provide temporary roof protection consisting of 10-mil polyethylene sheeting following abatement over the open roof areas. Strict coordination with the General Asbestos abatement contractor, Construction Project Manager and/or Architect is required and necessary during this phase of abatement.

o. Preliminary examination shall be conducted and precautions shall be taken to prevent damage to the interior of the building, including but not limited to office equipment, furniture, carpeted and wooden floors, etc., and to ensure no adverse effect on the structural stability of the roof due to the abatement activity.

p. Abatement activities shall not be carried out during adverse weather conditions (e.g., precipitation, heavy winds, etc.).

q. The floor area between the remote decontamination facility and the Work Area must be protected with 2 layers of 6-mil. polyethylene sheeting suitably anchored.

r. Provisions shall be made to ensure a safe and adequate air supply to affected building(s). All vents, skylights, air intakes, windows and doors opening onto the roof, and all other openings are to be sealed with two layers of 6-mil plastic or fitted with HEPA-filters where appropriate. In lieu of sealing vents, air intakes, etc., with two layers of plastic or HEPA-filters, temporary extensions may be installed to a height of 10 feet to ensure adequate air exchange. Drains may be equipped with 5 micron filtering systems in lieu of being sealed.

s. Pre-Removal Inspections:

(1) Prior to removal of any ACM, the Asbestos abatement contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Roofing and Flashing Materials:

a. The asbestos abatement contractor shall be responsible for the removal of all roofing components, including multiple layers of built-up membrane, tar, vapor barrier and/or flashing down to the substrate/deck.

b. Prior to actual removal, the built-up roofing shall be blanketed and wetted with a minimum 1" coating of the acceptable foam or viscous liquid which shall be maintained for the duration of the removal until the material is bagged. The foam or viscous liquid shall be confined to the work area.

c. Hand-held power tools used to drill, cut into, or otherwise disturb the ACRM shall be equipped with the HEPA-filtered local exhaust ventilation and operated to prevent potential fiber release.

d. Abatement shall not be performed in adverse weather conditions (e.g., precipitation, heavy winds, etc.). Asbestos abatement contractor shall protect all exposed roof during adverse weather conditions.

e. Portable HEPA-vacuum machines shall be available during abatement.

f. After the ACM removal and bagging, the bagged waste shall be HEPA-vacuumed, and then wet-cleaned and transferred into the shower room for double bagging. The double-bagged waste shall be transferred outside the clean room for its final transfer for storage in an enclosed waste container.

3. Following Removal of ACM Roofing and/or Flashing:

a. Upon completion of the abatement in roof work area, clean-up procedures shall involve removal and bagging of:

b. The asbestos containing roofing material (ACRM)

c. Visible accumulations of asbestos containing waste

d. All excess foam or similar viscous liquid

e. All debris, and shall be followed by a thorough wet cleaning.

f. All tools shall be wet cleaned and HEPA-vacuumed, and then removed from the work area upon completion.

g. Following the removal of all debris, the work area shall be thoroughly wet cleaned. The work area shall be allowed to dry completely before the visual inspection is conducted. The inspection shall confirm the absence in the work area of:

(1) ACM, debris, bagged ACM waste,

(2) Excess foam or other viscous liquid.

h. If the work area fails visual inspection, it shall undergo another wet cleaning and/or HEPA vacuuming until it passes the visual inspection.

i. When the visual inspection and clearance testing is successful, all plastic may be removed.

j. Air monitoring shall be conducted in accordance with the relevant provisions of Air sampling shall be conducted in compliance with NYC DEP Title 15 Chapter 1, §1-41 Air Sampling Schedule.

F. Removal of ACM Vertical and/or Sloping sections of Roof Flashing or of sloping sections of ACRM in New York City utilizing NYC DEP Variance Attachment FT (Addendum Attachment to FR) shall be as follows:

1. Preparation procedures:

a. Vertical and/or sloping sections of roof flashing, or any sloping sections of ACRM, shall not be removed using procedures of Attachment FR or of any modification of Attachment FR. The preliminary test set forth in this requirement must meet the air monitoring requirements.

b. At least TWO MODIFIED TENTS constructed as per the DEP/ACP Attachment TM shall be installed, each enclosing not less than 50 square feet approximately nor more than 160 square feet approximately of vertical and/or sloping sections of the in-place roof flashing or sloping sections of ACRM.

c. Engineering controls shall NOT be applied to each tent and therefore NO air volume changes shall occur within each tent during the flashing removal or during the ACRM removals as specified in Item 4 below.

d. Using CONTINUOUS spraying at the point of removal, with foam as specified in Attachment FR's section B) within one tent at a time, the vertical and/or sloping sections of roof flashing or the sloping sections of ACRM shall be removed by manual methods.

e. Inside each tent in sequence, continuous air sampling shall be performed during the entire removal procedure.

f. The city shall require the Third-Party Air Monitor to perform the air sampling.

g. The city shall assess the air sampling analyses from each of the two tents and shall declare the in-tent air monitoring to be acceptable.

h. Any tent inside which any individual analysis exceeded 0.01 fibers/cc of air shall be subjected to final air clearance procedures before dismantling.

i. Where the in-tent air monitoring gives acceptable results as, removal of the remaining vertical and/or sloping roof flashing or remaining sloping sections of ACRM may be permitted to occur, using CONTINUOUS spraying of foam at ALL points of removal without tent enclosures and foam blanket.

j. Abatement activities shall not be carried out during adverse weather conditions (e.g., precipitation, heavy winds, etc.).

k. The work area on the roof shall be cordoned off, and only authorized persons shall have access to the "designated" work area.

l. Movable objects shall be removed from the work area, or kept in place and wrapped in one sheet of 6-mil plastic sheeting. Fixed objects including perimeter walls, bulkheads, cooling towers, ducts and other rooftop appurtenances shall be covered in one sheet of plastic (minimum height of 6 feet).

m. The worker decontamination unit shall be constructed at an entry/exit from each work area with at least a shower room and a clean room. In addition to the shower head(s), the shower room shall be equipped with a flexible hose for waste decontamination for removal of less than 1,000 square feet. For more than 1,000 square feet of removal, a separate waste decontamination facility shall be located at an entry/exit from each work area.

n. The floor area between the remote decontamination facility and the Work Area must be protected with 2 layers of 6-mil. polyethylene sheeting suitably anchored.

o. Provisions shall be made to ensure a safe and adequate air supply to affected building(s). All vents, skylights, air intakes, windows and doors opening onto the roof, and all other openings are to be sealed with two layers of 6-mil plastic or fitted with HEPA-filters where appropriate. In lieu of sealing vents, air intakes, etc., with two layers of plastic or HEPA-filters, temporary extensions may be installed to a height of 10 feet to ensure adequate air exchange. Drains may be equipped with 5 micron filtering systems in lieu of being sealed.

2. Pre-Removal Inspections:

a. Prior to removal of any ACM, the asbestos abatement contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

b. Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

c. Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

3. Removal of ACM Vertical and/or Sloping sections of Roof Flashing or the Sloping sections of ACRM:

   a. The asbestos abatement contractor shall be responsible for the removal of all vertical and/or sloping sections of roof flashing or the sloping sections of ACRM down to the substrate/deck.

   b. Abatement shall not be performed in adverse weather conditions (e.g., precipitation, heavy winds, etc.). Asbestos abatement contractor shall protect all exposed roof during adverse weather conditions.

   c. Prior to actual removal, the material shall be blanketed and wetted with a minimum two-inch thick coating of the acceptable foam or viscous liquid which shall be maintained for the duration of the removal until the material is bagged. The foam or viscous liquid shall be confined to the work area.

   d. Manual methods of removal are recommended, however, if hand-held power tools are used to drill, cut into, or otherwise disturb the asbestos-containing roofing material, the power tools shall be equipped with HEPA-filtered local exhaust ventilation and operated to prevent potential fiber release.

   e. Portable HEPA-vacuum machines shall be available during abatement.

   f. After the ACM removal and bagging, the bagged waste shall be HEPA-vacuumed then wet cleaned and transferred into the shower room for double bagging. The double-bagged waste shall be transferred outside the clean room for its final transfer for storage in an enclosed waste container.

4. Following Removal of ACM Vertical and/or Sloping sections of Roof Flashing or the Sloping sections of ACRM:

   a. Upon completion of the abatement in roof work area, clean-up procedures shall involve removal and bagging of:

   b. The asbestos containing roofing material (ACRM)

   c. Visible accumulations of asbestos containing waste

   d. All excess foam or similar viscous liquid

   e. All debris, and shall be followed by a thorough wet cleaning.

f. All tools shall be wet cleaned and HEPA-vacuumed, and then removed from the work area upon completion.

g. The work area shall be allowed to dry completely before the visual inspection is conducted. The inspection shall confirm the absence in the work area of:

h. ACM, debris, bagged ACM waste,

i. Excess foam or other viscous liquid.

j. If the work area fails visual inspection, it shall undergo another wet cleaning and/or HEPA vacuuming until it passes the visual inspection.

k. When the visual inspection and clearance testing is successful, all plastic may be removed.

4.02 MAINTENANCE OF CONTAINED WORK AREA AND DECONTAMINATION ENCLOSURE SYSTEMS

A. Ensure that barriers are installed in a manner appropriate to the expected weather conditions during the project and for its duration. Repair damaged barriers and remedy defects immediately upon their discovery. Visually inspect barriers at the beginning and end of each work period.

B. Visually inspect non-Work Areas and the decontamination enclosure system for water leakage. Check the floor below, ceiling and walls, and view beneath/or around the decontamination enclosure system, for signs of leakage. Perform the visual inspection a minimum of two times for each 8-hour work shift.

PART 5 – ASBESTOS WASTE MANAGEMENT

5.01 ACM WASTE REQUIREMENTS

A. The asbestos abatement contractor and all sub-asbestos abatement contractors are specifically alerted to the illegal practice of combining asbestos-containing waste (ACW) from one project with the ACW of other projects without using the services of a permitted waste transfer station as defined by 6 NYCRR Part 360 and 364. As part of the shop drawing submittals, the Asbestos abatement contractor must submit for approval the proposed method of transportation and disposal that will be utilized to manage the ACW of this Contract. If a permitted transfer station is to be used, the cost shall be included in the work. The asbestos abatement contractor must submit a waste manifest consistent with whatever approved method is utilized as part of the invoicing and payment procedures.

B. The asbestos abatement contractor shall maintain compliance with the strictest set of regulations of Title 15, Chapter 1 of RCNY, NYC LL 70/85, NYS DOL ICR 56, USEPA, Asbestos Regulation 40 CFR Section 61.152, 29 CFR 1926.1101, 29 CFR 1910.1200 (F) of OSHA's Hazard Communication Standards, and other applicable standards.

NOTE: Any penalties incurred for failure to comply with any of the above regulations will be the sole responsibility for fines imposed due to negligence of the Asbestos abatement contractor.

C. When presenting ACW for storage at the generation site, the Asbestos abatement contractor shall:

1. Wet down ACW in a manner sufficient to prevent all visible emissions of dust into the air.

2. Seal material in a leak tight container while wet.

3. Keep ACW separate from any other waste.

D. When presenting ACW for storage away from the site of generation, the Asbestos abatement contractor shall:

1. Ensure that ACW has been properly packaged as per requirements above.

2. Examine the containers of ACW to ensure that there are no breaks in the containers and that no visible dust is being released into the air.

3. If examination reveals damage to a container of ACW the Asbestos abatement contractor or person accepting the waste shall immediately wet down the ACW and repackage it into a clean leak tight container. The subsequent repackaging shall be the financial responsibility of the Asbestos abatement contractor and occur at no extra cost to the City.

4. Keep ACW separate from any other waste.

E. When storing ACW – The Asbestos abatement contractor shall:

1. Ensure that the ACW has been sufficiently wetted down in tight containers.

2. Re-wet and repackage any damaged containers.

3. Maintain at storage site an adequate supply of spare leak tight containers.

4. Maintain at storage site an adequate supply of amended water.

5. Keep ACW separate from any other waste.

6. Keep ACW in a secured, enclosed, and locked container.

7. If the Asbestos abatement contractor has intention of sorting a quantity of ACW greater than or equal to 50 cubic yards, the Asbestos abatement contractor shall:

   a. Submit a written request and receive written approval from the City.

F. When presenting for transport, the Asbestos abatement contractor shall:

1. Ensure that ACW has been sufficiently wetted down.

2. Examine the integrity of the container's airtight seal.

3. Re-wet and repackage any damaged containers.

4. Keep ACW separate from all other waste.

5. Ensure that a person transporting asbestos waste holds a valid permit issued pursuant to law.

6. Frequency of Waste Removal:

   a. Properly packaged and labeled asbestos waste shall be removed from the site on a daily basis. Under no circumstance shall asbestos waste be stored on site without written approval from the City. The Waste Hauler and landfill shall be as indicated on the notifications to regulatory agencies.

G. Waste Load-out Through Equipment Decontamination Enclosure (Full Decontamination Facility): Place asbestos waste in disposal bags. Large items not able to fit into disposal bags shall be wrapped in one layer of 6-mil thick polyethylene sheeting. Clean outer covering of asbestos waste package by wet cleaning and/or HEPA-vacuuming in a designated part of the Work Area. Move wrapped asbestos waste to the equipment washroom, wet clean each bag or object and place it inside a second disposal bag, or a second layer of 6-mil polyethylene sheeting, as the item's physical characteristics demand. Air volume shall be minimized, and the bags or sheeting shall be sealed airtight with tape.

1. The clean containerized items shall be moved to the equipment decontamination enclosure holding area pending load-out to storage or disposal facilities.

2. Workers who have entered the equipment decontamination enclosure system from the uncontaminated non-Work Area shall perform load-out of containers from the decontamination enclosure holding area. Dress workers moving asbestos waste to storage or disposal facilities in clean overalls of a

color different than from that of coveralls used in the Work Area. Ensure that workers do not enter from uncontaminated areas into the equipment washroom or the Work Area. Ensure that contaminated workers do not exit the Work Area through the equipment decontamination enclosure system.

3. Thoroughly clean the equipment decontamination enclosure system immediately upon completion of the waste load-out activities, and at the completion of each work shift.

4. Labeled ACM waste containers or bags shall not be used for non-ACM debris or trash. Any materials placed in labeled containers or bags, including those turned "inside-out", shall be handled and disposed of as ACM waste.

H. All asbestos materials, wastes, shower water, polyethylene, disposable equipment and supplies shall be disposed of as asbestos contaminated waste, in accordance with the EPA regulation (40 CFR, Section 61.150) and those requirements of the New York Department of Environmental Conservation and New York City Department of Sanitation.

I. All asbestos materials shall be prepared for transportation in accordance with this specification and all applicable Federal, State, County and City Regulations. asbestos abatement contractor shall submit the following documentation:

1. Where applicable, an EPA Generator's identification number which has been obtained from the EPA for all asbestos waste generated from the project.

2. Applicable State Waste Hauler license and registration numbers.

3. Federal Hazardous Materials Waste Hauler number.

4. Designated landfill EPA Permit numbers.

J. Prior to loading asbestos waste the enclosed cargo areas (dumpster) shall be prepared as follows:

1. Clean via HEPA-vacuum and wet wipe techniques the enclosed cargo areas of all visible debris prior to preparing with polyethylene.

2. Line the cargo area with two layers of 6-mil polyethylene sheeting to prevent contamination from damaged or leaking containers. Floor sheeting shall be installed first and extend up the walls a minimum of 24-inches. Wall sheeting shall be overlapped and taped securely into place.

K. Asbestos-containing waste shall be placed on level surfaces in the cargo area of the dumpster and shall be packed tightly to prevent any shifting or tipping of the waste during transportation.

L. Asbestos-containing waste shall not be thrown into or dropped from the dumpster. All material shall be handled carefully to prevent rupture of the containers.

M. All personnel engaged in handling and loading of asbestos contaminated waste outside of the Work Area shall wear protective clothing. The disposable clothing shall include head, body and foot protection and color of clothing shall be different from abatement personnel in the Work Area. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters.

N. Asbestos abatement contractor shall immediately clean debris or residue observed on containers or surfaces outside of the Work Area. Cleaning shall be via HEPA equipped wet/dry vacuums only.

O. All asbestos-containing waste shall be transported from the abatement site to the landfill by a registered Waste Hauler. When transporting ACW:

1. Ensure that the ACW has been sufficiently wetted down in a leak tight container.

2. Re-wet and repackage any damaged containers.

3. Maintain at storage site an adequate supply of spare leak tight containers.

4. Maintain at storage site an adequate supply of amended water.

5. Keep ACW separate from any other waste.

P. Keep ACW in a secured, enclosed, and locked container.

Q. Waste transport documents shall conform to the requirements of the U.S. Department of Transportation, Hazardous Materials Transportation Regulation, 49 CFR Part 173 and EPA 40 CFR 61.150 (d)(1)(2). Shipping documents shall be clearly marked with the required designation "RQ Asbestos". Asbestos abatement contractor shall provide a copy of this document to the City.

R. A uniform hazardous waste manifest shall be prepared by the asbestos abatement contractor and signed by the asbestos abatement contractor each time the asbestos abatement contractor ships a dumpster load of Asbestos-Containing Waste Material. The uniform hazardous waste manifest shall include the site of waste generation, the names and addresses of the Transporter, the asbestos abatement contractor, and the landfill operator with information on the type and number of asbestos-waste containers, time and date. Asbestos abatement contractor shall provide the Construction Project Manager, Third-Party Air Monitor or authorized designated representative with signed copies of the waste manifest before each departure.

S. Asbestos abatement contractor or his registered hazardous Waste Hauler shall transport asbestos-containing waste material from the abatement site directly to the specified disposal site. Asbestos abatement contractor or their Waste Hauler shall not accept material from any other site when transporting asbestos-containing waste material from the abatement site. The authorized DDC representative or Construction Project Manager reserves the right to travel with asbestos abatement contractor's Waste Hauler to the waste disposal site. No intermediate storage of waste material (i.e., asbestos abatement contractor's warehouse) shall be permitted.

T. Final or progress application for payments will not be processed unless all hazardous waste manifests generated to date have been received and reviewed by the Construction Project Manager.

U. All asbestos materials, wastes, shower water, polyethylene disposable equipment and supplies shall be disposed of as asbestos contaminated waste, in accordance with the EPA regulation (40 CFR, Section 61.150) and those requirements of the New York State Department of Environmental Conservation and the New York Department of Sanitation.

V. Asbestos abatement contractor shall transport all sealed drums to a landfill disposal site approved by the Department of Environmental Conservation and the EPA. Transportation shall be performed by a New York State registered Waste Hauler, where required. When presenting the ACW for disposal the Asbestos abatement contractor or sub Asbestos abatement contractor shall:

1. Ensure that waste container is properly labeled according to the National Emission Standard for Hazardous Air Pollutants (NESHAP); Asbestos Revision, 40 CFR, Part 61, Subpart M. The labels shall include the name of the waste generator and the location where the waste was generated.

2. Comply with all applicable orders issued pursuant to asbestos disposal.

3. Ensure that ACW has been sufficiently wetted down.

4. Re-wet and repackage any damaged containers.

5. Keep ACW separate from all other wastes.

W. Asbestos abatement contractor shall notify the waste disposal site, at least 24 hours prior to transportation of asbestos contaminated waste to be delivered. Asbestos abatement contractor shall determine if a larger notification period is required.

X. At the site asbestos abatement contractors or Waste Hauler trucks shall approach the dump location as close as possible for unloading asbestos waste. Containers shall be carefully placed in the ground. Do not throw containers from truck.

Y. Asbestos abatement contractor or Waste Hauler shall inspect containers as they are unloaded at the disposal site. Material in damaged containers shall be repacked in empty containers, as necessary.

Z. Asbestos abatement contractor or Waste Hauler shall not remove asbestos-containing waste Material from drums unless required to do so by the disposal site City. Used drums shall be disposed of as asbestos-asbestos contaminated waste.

AA. All personnel engaged in unloading of the containers at the waste site shall wear protective clothing. The disposable clothing shall include head, body and foot protection. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters. Workers shall remove their protective clothing at the disposal site, place it in labeled disposal bags and leave them with the deposited waste shipment.

BB. For the compaction operation, the asbestos abatement contractor shall ensure that disposal sites personnel have been provided with personal protective equipment by the disposal operator. If the disposal site City has not provided this protective equipment, theasbestos abatement contractor shall supply protective clothing and respiratory protection for the duration of this operation (PAPR respirators are mandatory).

CC. If containers are broken or damaged, the asbestos abatement contractor or Waste Hauler shall, using personnel who are properly trained and wearing proper protective equipment, shall repackage the waste in properly labeled containers. Asbestos abatement contractor shall then clean the entire truck and its contents using HEPA-vacuums and wet cleaning techniques until no visible residue is observed.

DD. Following the removal of all containerized waste, the asbestos abatement contractor shall decontaminate the truck cargo area using HEPA-vacuums and/or wet cleaning techniques until no residue is observed. All 6-mil polyethylene sheeting shall be removed and discarded as asbestos-containing waste material along with contaminated cleaning material and protective clothing, in containers at the disposal site.

EE. The transporter(s) of all asbestos waste shall not back-haul any items on his return from landfill/disposal site.

FF. All asbestos waste shall be disposed of in an approved Asbestos Landfill site only.

1. NO PERSON UNDER ANY CIRCUMSTANCES SHALL ABANDON ACW. The same shall be disposed of only by certified persons in approved landfills.

2. A manifest form will be signed by the Landfill documenting receipt and acceptance of the asbestos-containing waste. This manifest will be furnished to the City of New York within thirty calendar days from the project completion date.

3. It is the responsibility of the Asbestos Asbestos abatement contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The Asbestos Asbestos abatement contractor must comply fully with these regulations and all appropriate U.S. Department of Transportation, EPA and other Federal, State and Local entities' regulations and all other current legal requirements.

4. The asbestos abatement contractor shall obtain an agreement from the transporter (s) that the practice of "Back-Hauling" will not be engaged in, with respect to any and all waste loads taken from this site during the work.

5. The asbestos abatement contractor will document actual disposal of the waste at the designated landfill by having completed a Disposal Certificate and will provide a copy of the same to the Department of Design and Construction.

PART 6 – ACCEPTANCE

6.01 ACCEPTANCE

Upon satisfactory completion of all decontamination procedures, a certificate will be issued by the Construction Project Manager with copies to all parties.

A. A letter of Compliance stating that all the work on the project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations.

B. All warranties as stated in the Specifications.

END OF SECTION 028213

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SECTION 032400

FIBROUS REINFORCING

PART 1.0 - GENERAL

1.1 SECTION INCLUDES

A. Synthetic structural fibers for concrete.

1.2 RELATED SECTIONS

A. Section 033000 - Cast-in-Place Concrete

1.3 REFERENCES

A. ASTM C 469 – Static Modules of Elasticity and Poisson's Ratio of Concrete in Compression.

B. ASTM D 1929 – Determining Ignition Temperature of Plastics.

C. ASTM D 2256 – Tensile Properties of Yarns by the Single-Strand Method.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data, including mixing instructions.

B. Manufacturer's Certification: Submit manufacturer's ISO 9001/9002 certification.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: IDO 9001/9002 registered or provide proof of documented quality assurance system. Quality assurance system shall be registered by independent registrar accredited by ANSI Registrar Accreditation Board (ANSI-RAB) or by another internationally recognized body.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver fibers in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and weight of fibers.

B. STORAGE:

1. Store fibers in clean, dry area in accordance with manufacturer's instructions.

2. Keep containers sealed until ready for use.

C. HANDLING: Protect fibers during handling to prevent contamination.

PART 2.0 PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: The Euclid Chemical Company.

B. Approved equal by:

1. Propex Fibermesh.

2. Nycon, Inc.

2.2 FIBROUS REINFORCING

A. Synthetic Fibers: Tuf-Strand SF synthetic structural fibers.

1. Description: Monofilament, self-fibrillating, polypropylene/polyethylene blend fibers.
2. Specific Gravity: 0.92.
3. Alkali, Acid, and Mildew Resistance: Excellent.
4. Fiber Length: 2 inches (50 mm).
5. Flash Point, ASTM D 1929: 625 degrees F (330 degrees C).
6. Modules of Elasticity, ASTM C 469: 625 ksi (4.3 GPa).
7. Tensile Strength, ASTM D 2256: 73 to 80 ksi (550 to 600 MPa).
8. Absorption: Negligible.
9. Color: White.
10. Dosage Rate 4.0 lbs/yds^3 (2.4 kg/m^3) of concrete.

PART 3.0 EXECUTION

3.1. MIXING

A. Add fibers into concrete mix in accordance with manufacturer's instructions.

B. Mix thoroughly to disperse fibers evenly in concrete.

B. Concrete shall be as specified in Section 03301.

END OF SECTION

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SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1.0 - GENERAL

1.01 GENERAL REQUIREMENTS

Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Cast In Place Concrete as shown on the drawings and specified herein, including but not limited to, the following:

1. Slabs on grade.
2. Spread footings;
3. Piers;
4. Foundation walls;
5. All reinforcing steel for the above work;
6. Setting of all anchor bolts and other steel attachments, provided by the other trades, in the C.I.P. work.
7. Grouting of all steel base plates for steel columns;
8. Temporary shoring, bracing as required for the concrete work.

1.03 RELATED WORK

A. LEED Submittals – Section 013329

B. Construction Waste Management – Section 017419

C. LEED Requirements – Section 018113

D. Earthwork - Section 312000

E. Concrete Floor Topping - Section 033000

F. Structural Steel - Section 051200

1.04 QUALITY ASSURANCES

A. Qualifications:

1. Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly trained and experienced in placing the types of concrete specified and who shall direct all work performed under this Section.

2. For finishing of exposed surfaces of the concrete, use only thoroughly trained and experienced journeyman concrete finishers.

B. Codes and Standards Compliance:

1. Work must comply with the latest edition of the following standard specifications and codes with the modifications as specified herein, provided however, that no requirement therein shall apply if it be in conflict with any provisions of the latest edition of the N.Y. City Building Code except as otherwise noted on the Drawings or as otherwise specified:

N.Y. City Building Code - Latest Edition;

ACI 318 - Building Code Requirements for Reinforced Concrete;

ACI 301 - Specifications for Structural Concrete for Building;

ACI 302.1.R - Guide for Concrete Floor and Slab Construction.

ACI 304 - Recommended Practice for Measuring, Mixing and Placing Concrete;

ACI 315 - Manual for Standard Practice for Detailing Reinforced Concrete Structures;

ACI 306 - Recommended Practice for Cold Weather Concreting;

ACI 305 - Recommended Practice for Hot Weather Concreting;

ACI 347 - Recommended Practice for Concrete Formwork;

CRSI Handbook - Recommended Practice for Placing Reinforcing Bars;

CRSI Handbook - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature;

CRSI Manual of Standard Practice;

ASTM - Applicable ASTM Standards in Building Codes;

National Ready-Mixed Concrete Association Publication: Concrete Plant Standards and Truck Mixer and Agitator Standards.

The contractor shall have a copy of each of these standards in his field office, and should be familiar with their contents as they pertain to this project.

C. Testing:

1. Testing shall be provided for all the concrete work as required by ACI 301 and New York City Building Code. However, 4 cylinders will be taken with each set, 2 will be broken at 7 days and remaining 2 at 28 days.

2. This testing work shall be done by a licensed engineer and a licensed testing laboratory, both retained and paid for by the Owner.

D. Sustainable Design Requirements

1. The Contractor is to implement practices and procedures to meet the Project's Sustainable Design goals, which include achieving LEED Silver. The Contractor shall ensure that the requirements related to these goals, as defined in this Section and in Related Sections of the Contract Documents, are implemented. Substitutions, or other changes to the Work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's Sustainable Design goals.

2. The Contractor is to efficiently use resources and energy while executing the Work of this Section. Resource efficient aspects to be considered in completing this Project include the use of techniques that minimize waste generation, reuse of construction materials on site where possible, and recycling of waste generated during the construction process.

3. Performance Requirements: The following criteria are required for the products included in this section

   a. Preference shall be given to cast-in-place concrete containing raw materials harvested or extracted within 500 miles of the project site.

   b. All reinforcing steel, steel anchors, welded wire fabric, and other steel items required by the work of this section shall contain a minimum of 50% (combined) pre-consumer/post-consumer recycled content.

   c. Adhesives, sealants, paints and coatings used for the work of this section shall meet the Volatile Organic Compound (VOC) limits specified in Section 018113 "LEED Requirements," where applicable.

E. LEED Performance Requirements:

1. Certification of recycled content, sourcing of materials, and VOC content shall be in accordance with the LEED Submittals requirements of this section.

1.05 PRODUCT HANDLING

A. Protection:

1. Use all means necessary to protect cast-in-place concrete materials formwork and reinforcing steel before, during and after installation and to protect the installed work and materials of all other trades.

2. Store all reinforcing steel in a manner to prevent excessive rusting fouling with dirt, grease and other bond breaking coatings.

B. Replacement:

In the event of damage to the concrete work, immediately make all repairs and replacements necessary to the approval of the Engineer and at no cost to the Owner.

1.06 SHOP DRAWINGS AND OTHER SUBMITTALS

A. Product Data: Submit data for all proprietary materials and items, including but not limited to reinforcement and forming accessories, admixtures, patching compounds, curing compounds waterstops and any others as requested by Architect. Samples of materials specified in this section shall be submitted to Architect for acceptance as requested by Architect.

B. Shop Drawings - Reinforcement: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures.

C. Where drawings do not indicate reinforcement, use ACI 305 and ACI 318 as guides to quantities and placement of rebars.

1. Show wall reinforcement in elevation.

2. Show location of all construction joints.

D. Mill certificates for cement.

E. Laboratory and Test Results: Submit laboratory test reports for concrete materials and mix designs as specified in ASTM C150, ASTM C33, ASTM C40, ASTM C88, C157, ASTM C260, ASTM C494, ASTM C192, and ASTM C30 as specified in ACI 301.

F. Concrete mix design.

G. Manufacturer's Test of Reinforcement - reinforcement shall be tested by the Manufacturer in accordance with the applicable ASTM Specifications and records of the tests or samples representative of the shipment shall be furnished in triplicate to the Architect prior to incorporation of the material into the work.

H. Substitutions: Any request for product substitutions must be submitted with all necessary documentation, for the Architect's review and action.

I. Certifications: Submit to the Architect in triplicate copies of certifications prepared by admixture manufacturer that the admixture contains no chlorides.

J. LEED Submittals:

A. Submit LEED Certification items as follows:

1. LEED Materials Certification Form: For all installed products and materials of this Section, complete the "Environmental Materials Reporting Form" (attached to end of Section 018113 "LEED Requirements"). Information to be supplied for this Form shall include:

a. Cost breakdowns for materials included in the Contractor or sub-contractor's Work. Material cost does not include costs associated with labor and equipment.
b. The percentages (by weight) of pre-consumer and/or post-consumer recycled content in the supplied product(s).
c. Indication of whether the raw materials have been extracted, harvested or recovered, as well as the final product has been manufactured (location of final assembly), within 500 miles of the project site.

B. VOC Reporting Form: For all installed products and materials of this Section, complete the "VOC Reporting Form" (attached to end of Section 018113 "LEED Requirements"). Information to be supplied for this Form shall include:

1. Provide generic name by means of product type or application of all field-applied interior adhesives, sealants, paints, and coatings in this Section.
2. Provide corresponding referenced standard limits.
3. Provide full name of supplied product(s) and vendor or manufacturer for each product in this Section.
4. For all field-applied interior adhesives, sealants, paints, and coatings in this Section, provide Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.

C. Letters of Certification: Provided by the manufacturer on the manufacturer's letterhead, verifying the amount of recycled content.

D. Product Cut Sheets: For all materials that meet the sustainable design performance criteria as per the LEED Performance Requirements of this section.

E. Material Safety Data Sheets (MSDS): For all applicable products. Applicable products include, but are not limited to, adhesives, sealants, paints, and coatings applied to the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) content of products submitted. If an MSDS does not indicate VOC content, then product data sheets, manufacturer's literature, or certification letter indicating a product's VOC content can be submitted with the MSDS.

F. Assemble required LEED Submittal information into one (1) package for each Specification Section or sub-contractor. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submittal products or assemblies.

PART 2.0 - PRODUCTS

2.01 CONCRETE

A. General:

All concrete, unless otherwise specifically permitted by the Engineer, shall be transit-mixed in accordance with ASTM C-94.

1. Form TR3: Technical Report Concrete Design Mix: The contractor shall be responsible for, and bear all costs associated with the filing and securing or approvals, if any, for Form TR3: Technical Report Concrete Design Mix, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures and professional seals, etc., compliant with NYC Department of Buildings requirements, for each concrete design mix.

B. Concrete Mix Proportions:

1. All concrete for the foundation work, including slabs on grade, shall be stone concrete.

2. All concrete shall have the following minimum compressive strengths at 28 days and shall be proportioned with the following limits:

Location of Concrete	Min. psi at 28 Days	Max. Size Aggregate	Max. Slump Ratio by	Max. Water/ Cement Weight
Foundation Concrete (Stone)	4,000	2 inch	4"	.46

The mix design shall be as per ACI 301, Methods I and II. For all slabs on grade, the minimum 3 day compressive strength shall be 1800 psi.

Concrete that will be pumped for other work shall comply with the requirements of ACI 304.2R for pumped concrete. Admixtures shall be used to improve workability such as air entraining as specified below, and water reducers. The mix for pumping proposed shall be a mix that has been successfully pumped on a previous job under very similar conditions or it shall be tested in the field for pumpability.

C. Cement:

All cement shall be Portland Cement conforming to ASTM C-150, Type I, and shall be the product of one manufacturer; the temperature of cement delivered to the plant shall not exceed 150 degrees F. All cement for work to remain exposed to view shall be one brand type and source.

D. Mineral Admixture: All fly ash mineral admixture to conform to ASTM Standard Specification C 618-99 Class F or Class C.

E. Water:

Water for mixing concrete shall be clean, fresh, and suitable for drinking.

F. Coarse Aggregate

1. Crushed stone or crushed washed gravel from approved source, free of dirt and organic materials. Coarse aggregate shall not contain over 2% (by weight) of dust passing 100 sieve, or over 3% (by weight) of soft, friable, elongated or laminated particles.

2. Grading requirements are given in Table 2, ASTM C33-90. Laboratory shall determine blending of coarse aggregate sizes, within gradation limits specified above, and corresponding to aggregate sizes designated in Table A "Concrete Classes".

3. Coarse aggregate shall be subjected to sodium sulphate soundness test according to ASTM C88-90 and shall have an average loss of no more than 12% after 5 cycles of alternate immersion and drying.

4. Protect aggregates from foreign materials and store each separately until placed in mixer.

G. Fine Aggregate: Natural sand consisting of clean, hard, durable uncoated particles. Organic content shall be determined according to ASTM C40-84 and shall show color no darker than reference standard color solution prepared at same time. Sand shall conform to ASTM C33-90.

H. Air Entrainment:

1. An air entrainment additive shall be added to achieve a minimum air content of 2% and a maximum of 3% for the slab on grade and 4% to 6% for all other concrete.

2. No other admixtures are permitted for the slab on grade.

3. Admixtures for the remaining work shall be permitted as per ACI 301.

I. Concrete Reinforcement:

All concrete reinforcement materials shall be new, free from rust, and complying with the following reference standards:

1. Bars for Reinforcement:

"Specifications for Deformed Billet-Steel Bars for Concrete Reinforcement", ASTM A-615, Grade 60.

2. Fibrous Reinforcing: - Where specified on the drawings for the slab on grade.

"Standard Specification for Fiber Reinforced Concrete and Shotcrete", ASTM C1116 – The Euclid Chemical Company, TUF - STRAND SF, SYNTHETIC MACRO FIBER:

a. Dosage Range – 3.0 to 20 lb/yd^3 (1.8 to 11.5 kg/m^3).

b. Recommended Dosage – 4 lb/yd^3 (2.4 kg/m^3).

J. Formwork:

1. The design and engineering of the formwork as well as its construction shall be the responsibility of the Contractor.

2. All formwork shall comply with the requirements of ACI 301.

3. Footings: May be poured against an earth form, or plywood may be used.

4. Walls and framed floors: Plywood and other wooden forms shall be used.

5. Form Sealer/Release Agents:

Form release agents shall be as manufactured by Chemmasters Corp. or approved equal. Use coatings in strict accordance with manufacturer's directions.

a. Plywood and wooden forms: Provide "Formlak" plastic form release coating.

b. Form liner and other formwork: Provide "Creteban" form release coating.

K. Ties and Spreaders for Forms:

1. Type:

All form ties shall be a type, which does not leave an open hole through the concrete and which permits neat and solid patching at every hole.

2. Design:

When forms are removed, all metal shall not be less than one inch from the surface.

3. Wire Ties and Wood Spreaders:

Do not use wire ties and wood spreaders.

L. Curing Materials:

Curing methods and materials shall conform to ACI 308-71. Burlap shall conform to AASHTO Spec. M182. Curing compounds shall conform to Federal Spec. TT-C-800a or Corps of Engineers Spec. CRD-C-300-77. For curing of slabs on grade see below.

M. Non-shrink Grout:

Grout for setting base plates, bearing plates, etc., and for pressure grouting shall be "EMBECO Premixed Grout" as made by Master Builders, or approved equal, with an allowable bearing pressure of 6,000 psi.

N. Joint Filler - Premolded polyethylene foam plank.

O. Joint Sealer - Elastomeric Polyurethane.

P. Other Materials:

All other materials, not specifically described but required for proper completion of concrete work, shall be as selected by the Contractor subject to the advance approval of the Engineer.

Q. Vapor Barrier:

15 mil thick polyethelene.

PART 3.0 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where Cast In Place Concrete is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

3.02 PREPARATION

A. General:

Preparation before placing the concrete shall conform to ACI 301, Chapters 8 and 13 and as specified below:

(Refer to notes on the drawings for sequence)

B. Preparation for Slab on Grade:

1. The surface of the slab base shall be inspected to insure that it has been placed to the proper level and the vapor barrier should be installed.

3.03 REINFORCING BAR BENDING

A. General:

1. Fabricate all reinforcement in strict accordance with the approved Shop Drawings and CRSI and ACI standards.

2. Do not use bars with kinks or bends not shown on the Drawings, or on the approved Shop Drawings.

3. Do not bend or strengthen steel in a manner that will injure the material.

B. Design:

1. Bend all bars cold.

2. Make bends for stirrups and ties around a pin having a diameter not less than two times the minimum thickness of the bar.

3. Make bends for other bars, including hooks, around a pin having diameter not less than six times the minimum thickness of the bar for #8 and smaller and eight times the thickness of the bar for #9 and larger.

4. All bar hooks not dimensioned in Drawings shall be ACI standard hooks unless noted.

3.04 PLACING REINFORCING BARS

A. General:

Before the start of concrete placement, accurately place all concrete reinforcement, positively securing and supporting by concrete blocks, metal chairs or spacers, or by metal hangers.

B. Clearance:

1. Preserve clear space between bars of not less than one time the normal diameter of round bars.

2. In no case let the clear distance be less than 1 inch or less than 1 1/3 times the maximum size of aggregate.

3. Provide the following concrete covering of reinforcement unless noted:

a. Concrete below ground deposited against forms: two inches.

b. Concrete deposited against earth: three inches.

c. Concrete elsewhere: Minimum required by ACI Code 318 unless noted.

C. Splicing:

1. Reinforcing Bars:

a. All bars are continuous unless otherwise noted.

b. Provide full tension laps at all splices with lengths as required by the ACI Code for a Class "B" splice, unless noted otherwise. Do not provide other splices except those shown on the Drawings without written approval by the Engineer.

c. Bars may be wired together at laps.

d. Wherever possible, stagger the splices of adjacent bars.

D. Dowels and Anchor Bolts:

Place all required steel dowels and anchor bolts and securely anchor them into position before the concrete is placed.

E. Obstructions:

In the event conduits, piping, inserts, sleeves, or any other items interfere with placing reinforcement as indicated on the drawings or as otherwise required, immediately consult the Engineer and obtain approval of new procedure before placing concrete.

3.05 WIRE FABRIC SLAB REINFORCING

See Drawings for type and locations.

3.06 CLEANING REINFORCEMENT

Steel reinforcement, at the time concrete is placed around it, shall be free from rust scale, loose mill scale, oil, plant and all other coatings, which will destroy or reduce bond between steel and concrete.

3.07 CONSTRUCTION OF FORMS

A. Construct all required forms to be substantial, sufficiently tight to prevent leakage of mortar, and able to withstand excessive deflection when filled with wet concrete, unless otherwise noted.

B. Slab Side Forms:

Side forms and bulkheads are to be pinned and securely braced to the substrate with sufficient accuracy to main vertical tolerance consistent with the flatness and level requirements specified herein.

C. Layout:

1. Form all required cast-in-place concrete to the shapes, sizes, lines and dimensions indicated on the Drawings.

2. Exercise particular care in the layout of forms to avoid necessity for cutting of concrete after it is in place.

3. Make proper provision for all openings, offsets, recesses, anchorage, blocking, and other features of the Work as shown or required.

4. Perform all forming required for work of other trades, and do all cutting and repairing of forms required to permit such installation.

D. Bracing:

1. Properly brace and tie the forms together where necessary, so as to maintain position and shape and to ensure safety to personnel.

2. Construct all bracing and falsework, of ample size and strength to safely carry, without excessive deflection, all loads to which they may be subjected.

3. Properly set the forms apart and securely tie them together where required, using metal spreader ties that give positive tieing and accurate spreading.'

E. Tolerances:

Construct all forms straight, true, and plumb, and square within a tolerance prescribed in ACI 301.

F. Wetting:

Keep forms sufficiently wetted to prevent joints opening up before concrete is placed.

3.08 PLYWOOD FORMS

A. Design:

Nail the plywood panels directly to studs and apply in a manner to minimize the number of joints.

B. Joints:

Make all panel joints tight butt joints with all edges true and square.

3.09 PLACING CONCRETE

A. Method:

The following methods shall be employed:

1. Convey concrete from mixer to place of final deposit by methods that will prevent separation and loss of materials.

2. For chuting, pumping (no pumping allowed for slab on grade) and pneumatically conveying concrete, use only equipment of such size and design as to ensure a practically continuous flow of concrete at the delivery end without loss or separation of materials.

3. Deposit concrete as nearly as possible in its final position to avoid segregation of materials.

4. Place concrete as dry as possible consistent with good workmanship, never exceeding the maximum specified slump.

B. The rate of placement shall be as follows:

1. Place concrete at such a rate that concrete is at all times plastic and flows readily between bare bars.

2. When placing is once started, carry it on as a continuous operation until placement of the panel or section is complete.

3. Do not pour a greater area at one time than can be properly finished without checking; this is particularly important during hot or dry weather.

C. Properly compact concrete as follows:

1. Thoroughly consolidate all concrete by suitable means during placement, working it around all embedded fixtures and into corners of forms.

2. During placement, thoroughly compact the concrete by hand tamping and by mechanical vibration.

D. Acceptability:

Retempered concrete or concrete that has been contaminated by foreign materials shall not be used.

E. Placing Concrete Slabs:

Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a pour strip is complete. Pumping of concrete for the slab on grade is not allowed.

3.10 JOINTS AND EMBEDDED ITEMS

A. Construction joints and control joists shall conform to ACI 301, and to the details shown on the drawings.

B. Embedded Items:

No aluminum shall be embedded in concrete.

3.11 COLD WEATHER REQUIREMENTS

A. Do not place concrete when temperature is 40 degrees F. and falling and when freezing weather is predicted within 4 hours, unless the following conditions for cold weather concreting are met:

Subject to written approval of a letter of request to the Engineer "Recommended Practice for Winter Concreting", ACI 306, may be followed for placing concrete in cold weather with the following exceptions:

1. No calcium chloride or other accelerators or "anti-freezes" shall be used.

2. High early strength (Type III) cement shall not be used.

3. In addition to laboratory cured test specimens, additional concrete test specimens shall be cured under field conditions as required and directed by the engineer to check the adequacy of curing and protection of the concrete.

3.12 HOT WEATHER REQUIREMENTS

A. Placement shall be as follows:

1. Do not use concrete with a placing temperature that will cause difficulty from loss of slump, flash set, or cold joints.

2. Maintain a concrete temperature during placement of less than 90 degrees F.

3. Use all means necessary to avoid drying the concrete prior to finishing operations.

4. Work shall be in accordance with ACI 305, "RECOMMENDED PRACTICE FOR HOT WEATHER CONCRETING".

5. Provide and use all required windbreaks, sunshades, fog sprays, and other devices to protect the concrete during placement.

3.13 LEVELING AND FINISHING

A. Slab on Grade:

1. The slabs shall be leveled and finished to the standard minimum surface tolerance, for levelness and straightness, as specified in ACI 301.

2. Provide equipment and method required to achieve finish and flatness as required herein.

3. Finish slab with a hard steel trowel finish.

B. Other Concrete Work:

1. All concrete that is not exposed to view, such as all the back of walls and all concrete below grade, shall receive a "rough form finish".

2. All concrete that is exposed to view shall receive a "smooth form finish". This includes the underside of all framed floor construction, which shall be exposed.

3.14 CURING

A. General:

Fresh concrete shall be protected from heavy rains, flowing water, and mechanical injury. All concrete shall be protected from the sun and drying winds.

B. Cure all concrete as per ACI A301, CHAPTER 12.

C. Apply coats of any curing compound in accordance with manufacturer's written instructions.

D. Forms:

Wet all forms at least twice daily, for at least five days after placement of concrete.

3.15 REMOVAL OF FORMS

A. General:

1. Use all means necessary to protect workmen, passersby, the installed work and materials of other trades, and the complete safety of the structures.

2. Cut nails and tie wires of form ties off flush, and leave all surfaces smooth and clean.

3. Remove metal spreader ties on exposed concrete by removing or snapping off inside the wall surface and pointing up and rubbing the resulting pockets to match the surrounding areas.

4. Flush all holes resulting from the use of spreader rods and sleeve nuts, using water, and then solidly pack throughout the wall thickness with cement grout applied under pressure by means of a grouting gun; grout shall be one part Portland Cement to 2-1/2 parts sand; apply grout immediately after removing forms.

3.16 DEFECTIVE WORK

A. Inspection:

Immediately after forms have been removed, the contractor shall inspect all concrete surfaces and patch all pour joints, rock pockets for ties holes and other imperfections before the concrete is thoroughly dry.

Do not patch until concrete has been inspected by the Engineer.

B. Patching:

1. Minor defective areas shall be patched as follows:

a. Chip away to a depth of about one inch, leaving edges perpendicular to the surface; wet the area to be patched and a space of at least six inches wide around it to prevent water being absorbed out of the mortar.

b. Patching mortar shall consist of one part cement to three parts sand using water to achieve a consistency as dry as possible within the requirements of handling and placing; add one pint Chem-Master "Polyweld" to each bag cement; thoroughly compact the mortar by ramming it into place.

c. Screed off so as to leave the patch slightly higher than surrounding surfaces; leave undisturbed for a period of one to two hours to permit initial shrinkage, and then perform final finishing.

d. Finish the patch to match adjacent surfaces.

2. Major Defective Areas:

If the defects are serious and affect the strength of the structure, or if patching does not satisfactorily restore the quality and appearance of the surface, the Architect may require "cement gun concrete" to be used or the concrete to be removed and replaced completely in accordance with the provisions of this Section, all at no additional cost to the Owner and to the satisfaction of the Architect.

END OF SECTION

SECTION 035300

CONCRETE FLOOR TOPPING

PART 1 - GENERAL

1.1 GENERAL REQUIRMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

B. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 SUMMARY

A. This Section includes the following:
1. Mineral-aggregate concrete floor topping.
2. Metallic-aggregate concrete floor topping.

B. Related Sections include the following:
1. LEED Submittals - Section 013329.
2. Construction Waste Management - Section 017419.
3. LEED Requirements - Section 018113.
4. Environmental Practices - Section 018116.
5. Construction IAQ Management - Section 018119.
6. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.
7. Cast In Place Concrete – Section 033000

8. Painting and Finishing – Section 099000

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:
   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.
2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.
3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).
4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit data for all proprietary materials and items, including but not limited to reinforcement and forming accessories, admixtures, patching compounds, curing compounds waterstops and any others as requested by Commissioner. Samples of materials specified in this section shall be submitted to Commissioner for acceptance as requested by Commissioner.

C. Mill certificates for cement.

D. Laboratory and Test Results: Submit laboratory test reports for concrete materials and mix designs as specified in ASTM C150, ASTM C33, ASTM C40, ASTM C88, C157, ASTM C260, ASTM C494, ASTM C192, and ASTM C30 as specified in ACI 301.

E. Concrete mix design.

F. Mockups: Cast topping mockups to demonstrate typical joints, surface finish, bonding, texture, tolerances, and standard of workmanship.

G. Material Test Reports: From a qualified testing agency indicating and interpreting test results of toppings for compliance with requirements indicated.

H. Certifications: Submit to the Commissioner in triplicate copies of certifications prepared by admixture manufacturer that the admixture contains no chlorides.

I. Minutes of preinstallation conference.

1.5 LEED PERFORMANCE CRITERIA

A. Field Applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly trained and experienced in placing the types of concrete specified and who shall direct all work performed under this Section.

   2. For finishing of exposed surfaces of the concrete, use only thoroughly trained and experienced journeyman concrete finishers.

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

C. Codes and Standards Compliance:

1. Work must comply with the latest edition of the following standard specifications and codes with the modifications as specified herein, provided however, that no requirement therein shall apply if it be in conflict with any provisions of the latest edition of the N.Y. City Building Code except as otherwise noted on the Drawings or as otherwise specified:

Mockup N.Y. City Building Code - Latest Edition;

ACI 318 - Building Code Requirements for Reinforced Concrete;

ACI 301 - Specifications for Structural Concrete for Building;

ACI 302.1.R - Guide for Concrete Floor and Slab Construction.

ACI 304 - Recommended Practice for Measuring, Mixing and Placing Concrete;

ACI 315 - Manual for Standard Practice for Detailing Reinforced Concrete Structures;

ACI 306 - Recommended Practice for Cold Weather Concreting;

ACI 305 - Recommended Practice for Hot Weather Concreting;

ACI 347 - Recommended Practice for Concrete Formwork;

CRSI Handbook - Recommended Practice for Placing Reinforcing Bars;

CRSI Handbook - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature;

CRSI Manual of Standard Practice;

ASTM - Applicable ASTM Standards in Building Codes;

National Ready-Mixed Concrete Association Publication: Concrete Plant Standards and Truck Mixer and Agitator Standards.

The contractor shall have a copy of each of these standards in his field office, and should be familiar with their contents as they pertain to this project.

D. Testing:

1. Testing shall be provided for all the concrete work as required by ACI 301 and New York City Building Code. However, 4 cylinders will be taken with each set, 2 will be broken at 7 days and remaining 2 at 28 days.

2. This testing work shall be done by a licensed engineer and a licensed testing laboratory, both retained and paid for by the City of New York.

3. Form TR3: Technical Report Concrete Design Mix: The contractor shall be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for Form TR3: Technical Report Concrete Design Mix, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures and professional seals, etc., compliant with NYC Department of Buildings requirements, for each concrete design mix.

E. Mock Ups: Cast topping mockups to demonstrate typical joints, surface finish, bonding, texture, tolerances, and standard of workmanship.

1. Build mockups approximately 100 sq. ft. in the location indicated or, if not indicated, as directed by Commissioner.
2. Notify Commissioner seven days in advance of dates and times when mockups will be constructed.
3. Obtain Commissioner's approval of mockups before starting construction.
4. If Commissioner determines that mockups do not meet requirements, demolish and remove them from the site and cast others until mockups are approved.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed.
7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage, mixing with other components, and application.

B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
   1. Place topping only when ambient temperature and temperature of base slabs are between 50 and 86 deg F.

B. Close areas to traffic during topping application and, after application, for time period recommended in writing by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. General: All concrete, unless otherwise specifically permitted by the Engineer, shall be transit-mixed in accordance with ASTM C-94.

B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

C. Products: Subject to compliance with requirements, provide one of the following:
   1. Mineral-Aggregate Topping:
      a. A-H Emery A-1 Premix; Anti-Hydro International, Inc.
      b. Emery Tuff Top; Dayton Superior Corporation.
      c. Emerytop 400; L&M Construction Chemicals, Inc.
      d. Met-Top E; Metalcrete Industries.
      e. Emeri-Crete Topping; Sternson Group.
   2. Iron-Aggregate Topping:
      a. A-H Irontop; Anti-Hydro International, Inc.
      b. Iron Topping RM; Burke Group, LLC (The).
      c. Conplate Floor Topping; Conspec Marketing & Manufacturing Co., Inc.
      d. Super Euco-Top; Euclid Chemical Co.
      e. Mastertop 300 Anvil-Top; Master Builders, Inc.
      f. Metalcrete; Metalcrete Industries.
      g. Ferrotop; Sternson Group.

2.2 CONCRETE FLOOR TOPPINGS

A. Mineral-Aggregate Topping: Factory-prepared and dry-packaged mixture of graded, crushed emery aggregate containing not less than 50 percent aluminum oxide, not less than 24 percent ferric oxide, and not more than 8 percent silica; portland cement or blended hydraulic cement; plasticizers; and other admixtures to which only water needs to be added at Project site.
   1. Compressive Strength (28 Days): 4000 psi; ASTM C 109/C 109M.

2.3 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: clean, fresh and Potable.

E. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 25 percent solids content, minimum.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 25 percent solids content, minimum.

2.4 RELATED MATERIALS

A. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.

B. Joint-Filler Strips: Premolded polyethylene foam plank.

C. Joint Sealer - Elastomeric Polyurethane.

D. Portland Cement: ASTM C 150, Type I or II.

E. Sand: ASTM C 404, fine aggregate passing No. 16 sieve.

F. Water: Potable.

G. Acrylic-Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

H. Epoxy Adhesive: ASTM C 881, Type V, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements.

2.5 MIXING

A. Bonding Slurry: Mix portland cement with water to a thick paint consistency.

B. Bonding Slurry: Mix 1 part portland cement and 1-1/2 parts sand minimum or Portland cement to sand ratio specified by product manufacturer with water and an acrylic-bonding agent according to manufacturer's written instructions to a thick paint consistency.

C. Topping: Mix topping materials and water in appropriate drum-type batch machine mixer or truck mixer according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of topping. Proceed with application only after unsatisfactory conditions have been corrected.

B. Verify that base slabs meet finish and surface profile requirements in Division 3 Section "Cast-in-Place Concrete."

C. Verify that base slabs are visibly dry and free of moisture. Test for capillary moisture by the plastic sheet method according to ASTM D 4263.

3.2 PREPARATION

A. Existing Concrete: Remove existing surface treatments and deteriorated and unsound concrete. Mechanically abrade base slabs to produce a heavily scarified surface profile with an amplitude of 1/4 inch.
   1. Prepare and clean existing base slabs according to topping manufacturer's written instructions. Fill voids, cracks, and cavities in base slabs.
   2. Mechanically remove contaminants from existing concrete that might impair bond of topping.
   3. Saw cut existing contraction and construction joints to a depth of 1/2 inch and fill with epoxy joint filler.

B. Install joint-filler strips where topping abuts vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with topping surface, unless otherwise indicated.
   2. Terminate full-width joint-filler strips 1/2 inch below topping surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
   3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.3 TOPPING APPLICATION

A. Start topping application in presence of manufacturer's technical representative.

B. Monolithic Topping: After textured-float finish is applied to fresh concrete of base slabs, specified in Division 3 Section "Cast-in-Place Concrete," place topping while concrete is still plastic.

C. Deferred Topping: Within 72 hours of placing base slabs, mix and scrub bonding slurry into dampened concrete to a thickness of 1/16 to 1/8 inch, without puddling. Place topping while slurry is still tacky.

D. Existing Concrete: Apply epoxy-bonding adhesive, mixed according to manufacturer's written instructions, and scrub into dry base slabs to a thickness of 1/16 to 1/8 inch, without puddling. Place topping while adhesive is still tacky.

E. Place topping continuously in a single layer, tamping and consolidating to achieve tight contact with bonding surface. Do not permit cold joints or seams to develop within pour strip.
   1. Screed surface with a straightedge and strike off to correct elevations.
   2. Slope surfaces uniformly where indicated.

3. Begin initial floating using bull floats to form a uniform and open-textured surface plane free of humps or hollows.

F. Finishing: Consolidate surface with power-driven floats as soon as topping can support equipment and operator. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
1. Hard Trowel Finish: After floating surface, apply first trowel finish and consolidate topping by power-driven trowel so no blisters develop. Continue troweling passes and restraighten until surface is smooth and uniform in texture.
   a. Finish surfaces to specified overall values of flatness, F(F) 25; and levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and levelness, F(L) 15, measured within 24 hours according to ASTM E 1155 (ASTM E 1155M) for a randomly trafficked floor surface.
   b. Finish and measure surface so gap at any point between topping surface and an unleveled freestanding 10-foot- long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed 1/4 inch.

G. Construction Joints: Construct joints true to line with faces perpendicular to surface plane of topping, at locations indicated or as approved by Commissioner.
1. Coat face of construction joint with epoxy adhesive at locations where topping is placed against hardened or partially hardened topping.

H. Contraction Joints: Form weakened-plane contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before topping develops random contraction cracks.
1. Form joints in topping over contraction joints in base slabs, unless otherwise indicated.
2. Construct contraction joints for a combined depth equal to topping thickness and not less than one-fourth of base-slab thickness.
3. Construct contraction joints for a depth equal to one-half of topping thickness, but not less than 1/2 inch deep.

3.4 PROTECTION AND CURING

A. General: Protect freshly placed topping from premature drying and excessive cold or hot temperatures.

B. Evaporation Retarder: Apply evaporation retarder to topping surfaces in hot, dry, or windy conditions before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying topping, but before float finishing.

C. Begin curing immediately after finishing topping. Cure by one or a combination of the following methods, according to topping manufacturer's written instructions:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with absorptive cover, water saturated and kept continuously wet. Cover topping surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days.

Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in two coats in continuous operations by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.5 JOINT FILLING

A. Prepare and clean contraction joints and install epoxy joint filler, according to manufacturer's written instructions, once topping has fully cured.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install epoxy joint filler full depth of contraction joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.6 DEFECTIVE WORK

A. Inspection:

Immediatley after forms have been removed, the contractor shall inspect all concrete surfaces and patch all pour joints, rock pockets for ties holes and other imperfections before the concrete is thoroughly dry.

Do not patch until concrete has been inspected by the Engineer.

B. Patching:

1. Minor defective areas shall be patched as follows:

   a. Chip away to a depth of about one inch, leaving edges perpendicular to the surface; wet the area to be patched and a space of at least six inches wide around it to prevent water being absorbed out of the mortar.

   b. Patching mortar shall consist of one part cement to three parts sand using water to achieve a consistency as dry as possible within the requirements of handling and placing; add one pint Chem-Master "Polyweld" to each bag cement; thoroughly compact the mortar by ramming it into place.

   c. Screed off so as to leave the patch slightly higher than surrounding surfaces; leave undisturbed for a period of one to two hours to permit initial shrinkage, and then perform final finishing.

   d. Finish the patch to match adjacent surfaces.

2. Major Defective Areas:

If the defects are serious and affect the strength of the structure, or if patching does not satisfactorily restore the quality and appearance of the surface, the Commissioner may require "cement gun concrete" to be used or the concrete to be removed and replaced completely in accordance with the provisions of this Section, all at no additional cost to the City of New York and to the satisfaction of the Commissioner.

3.7 REPAIRS

A. Defective Topping: Repair and patch defective topping areas, including areas that have not bonded to concrete substrate.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform tests and to prepare test reports during topping placement according to requirements specified in this Article.

B. Sample Sets: At point of placement, testing and inspecting agency shall take a set of 3 molded-cube samples from the topping mix for the first 1000 sq. ft. (93 sq. m) plus 1 set of samples for each subsequent 5000 sq. ft. (464 sq. m) of topping, or fraction thereof, but not less than 6 samples for each day's placement. Samples shall be tested according to ASTM C 109/C 109M for compliance with compressive strength requirements.

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SECTION 042000

UNIT MASONRY

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of regional materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the masonry work as indicated on the drawings and/or specified herein including, but not limited to, the following:

1. Concrete block walls.

2. Ground face concrete walls.

3. Metal joint reinforcing, anchors, ties, weeps, pea gravel and related accessories for masonry.

4. Control joints in masonry, filled with joint fillers.

5. Through-wall flashing.

6. Cavity drainage material.

7. Chases, recesses, pockets and openings in masonry as required for installation of work by others.

8. Building of items furnished by others into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.

9. Grouting in of metal items built into masonry work.

10. Masonry Sealers.

11. Protection, painting and cleaning of masonry.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Joint sealers - Section 079200.

H. Epoxy Resin Composition Flooring and Wall Coatings – Section 096723.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product data for each different masonry unit, accessory, and other manufactured product indicated.

C. Shop drawings for clay units showing type, dimension and location of each unit required.

D. Shop drawing indicating control joint location and details.

E. Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcing" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.

F. Samples For Initial Selection Purposes of the Following

1. Unit masonry samples showing full extent of colors and textures available for each different exposed masonry unit required.

2. Colored masonry mortar samples showing full extent of colors available.

G. Samples For Verification Purposes of the Following

1. Full-size units for each different exposed masonry unit required showing full range of exposed color, texture, and dimensions to be expected in completed construction.

2. Colored masonry mortar samples for each color required showing the full range of colors expected in the finished construction. Label samples to indicate type and amount of colorant used.

3. Joint reinforcing, each type, width and proposed locations (labeled).

4. Anchors, wedges and ties, each type, width and proposed locations (labeled).

5. Joint filler, each type.

6. Flashing, including splice sample, 12" x 12".

H. Preconstruction Testing: Contractor shall employ and pay a qualified independent testing laboratory to perform the following preconstruction testing indicated as well as

other inspecting and testing services required by referenced unit masonry standard or indicated herein for source and field quality control:

1. Concrete Masonry Unit Tests: For each different concrete masonry unit indicated, units will be tested for strength, absorption, and moisture content per ASTM C 140.

2. Prism Tests: For each type of wall construction indicated, masonry prisms will be tested per ASTM E 447, Method B.

3. Mortar properties will be tested per property specification of ASTM C 270.

4. Mortar composition and properties will be evaluated per ASTM C 780.

5. Grout compressive strength will be tested per ASTM C 1019.

I. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface of visually related surfaces.

J. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

K. Material certificates for the following signed by manufacturer and Contractor certifying that each material complies with requirements.

1. Each different cement product required for mortar and grout including name of manufacturer, brand, type, and weight slips at time of delivery.

2. Each material and grade indicated for reinforcing bars.

3. Each type and size of joint reinforcement.

4. Each type and size of anchors, ties, and metal accessories.

L. Material test reports from a qualified independent testing laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:

1. Mortar complying with property requirements of ASTM C 270.

2. Grout mixes. Include description of type and proportions of grout ingredients.

3. Masonry units.

M. Cold-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

N. Hot-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

O. Results from tests and inspections performed by Contractor's Testing Laboratory shall be reported promptly and in writing to the Commissioner.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 QUALITY ASSURANCE

A. Conform to the following non-cumulative tolerances (any masonry work not meeting these standards shall be re-built at no additional cost to the City of New York).

1. Variations From the Plumb

a. In lines and surfaces of columns, wall and arrises:

1).	In 10 feet	1/4"
2).	In any story of 25 feet maximum	3/8"
3).	In 40 feet or more	1/2"

2. Variation from the level or the grades indicated on the drawings; for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

a.	In any bay or 20 feet maximum	1/4"
b.	In 40 feet or more	1/2"

3. Variation of the linear building lines from established position in plan related portion of columns and partitions:

a.	In any bay or 20 feet maximum	1/2"
b.	In 40 feet or more	3/4"

4. Variations in cross-sectional dimensions of columns and in thickness of walls:

a.	Minus	1/4"
b.	Plus	1/2"

5. Variation in dimensions of masonry openings:

a. Horizontal dimension +/- 1/8"
b. Vertical dimension +/- 1/8"

B. Factory Control

1. The Commissioner reserves the right to visit the clay unit manufacturing facilities and review pre-sorting so that all clay units fall within an acceptable color range.

2. 4' x 4' sample panel shall be constructed at the factory using each clay unit specified. This sample panel, after approval of the Commissioner, shall become the quality control panel for the selected clay unit.

3. Prior to any shipment of the face clay unit from the factory, the Commissioner reserves the right to inspect the clay unit for the thoroughness of the pre-sorting and to reject any clay unit which in his opinion do not fall within acceptable color range.

C. Work of this Section shall conform to the requirements of the following:

1. ACI 530/ASCE 5 Building Code Requirements for Masonry Structures.

2. ACI 530-1/ASCE 6 Specifications for Masonry Structures.

D. Pre-Construction Conference: Prior to installation of masonry and associated work, Contractor shall arrange a meeting with Masonry Subcontractor, installers of related work, and other entities concerned with masonry wall performance, including the Commissioner and City of New York. Contractor shall record discussions and agreements and furnish copy to each participant. Provide at least seventy-two (72) hours' advance notice to participants prior to convening conference. Review methods and procedures related to masonry work, including, but not limited to, the following:

1. Review masonry requirements (drawings, specifications and other Contract Documents).

2. Review required submittals, both completed and yet to be completed.

3. Review and finalize construction schedule related to masonry work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

4. Review required inspection, testing, certifying and material usage accounting procedures.

5. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry materials to project in undamaged condition.

B. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes,

contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.

C. Store cementitious materials off the ground, under cover, and in dry location.

D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

E. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.

F. Pallets of clay units shall be double plastic wrapped for shipping.

1.8 PROJECT CONDITIONS

A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.

D. Cold-Weather Construction: Comply with referenced unit masonry standard for cold-weather construction and the following:

1. Do not lay masonry units that are wet or frozen.

2. Remove masonry damaged by freezing conditions.

E. Hot-Weather Construction: Comply with referenced unit masonry standard.

PART 2 PRODUCTS

2.1 MATERIALS, GENERAL

A. Comply with referenced unit masonry standard and other requirements specified in this Section applicable to each material indicated.

2.2 CONCRETE MASONRY UNITS (CMU)

A. General: Comply with requirements indicated below applicable to each form of concrete masonry units required.

1. Provide special shapes where indicated and as follows:

a. For lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
b. Closed end units for outside corners unless otherwise indicated.

2. Size: Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in the applicable referenced ASTM specification for concrete masonry units.

a. Concrete Masonry Units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated on drawings.
1). Standard Modular: 7-5/8 inches high by 15-5/8 inches long widths as shown on drawings.
2). Where Indicated: 3-5/8 inches high by 15-5/8 inches long widths as shown on drawings.

3. Provide Type I, moisture-controlled units.

4. Exposed Faces: Color and texture as scheduled.

5. Integral Water Repellent: For exposed exterior units, provide units made with integral water repellent equal to "Dry-Block" as manufactured by W.R. Grace & Co., or equivalent product of ACM Chemistries, BASF, or approved equal; liquid polymeric, integral water repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen.

B. Hollow and Solid Load-Bearing Concrete Masonry Units: ASTM C 90 and as follows:

1. Typical Block: Westbrook normal weight, smooth face, color as scheduled.

2. Unit Compressive Strength: Provide units with minimum average net area compressive strength as indicated in Structural General Notes.

3. Weight Classification: See Structural General Notes.

4. Absorption: Less than 5 percent.

5. The producer of the concrete masonry units shall furnish certification from an independent testing laboratory confirming that all 8" or larger masonry units meet all of the UL-618 requirements for two (2) hours or better (as required), referencing full scale fire test reports (ASTM E 119). All 4" and 6" units shall conform to "National Bureau of Standards" and "National Research Council" full scale fire tests.

C. Specialty Blocks:

1. Ground Face CMU: Westbrook Concrete Block Company, with integral waterproofing additive and sealers, or equivalent of Trenwyth, Nitterhouse, or approved equal; color as scheduled. Ground face block shall conform to standards indicated above.

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce required mortar color.

1. For colored pigmented mortars use premixed colored Portland/Lime cement mortar of formulation required to produce color.

2. All exposed masonry mortar shall be of color selected by Commissioner.

B. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this article, combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.

C. Hydrated Lime: ASTM C 207, Type S.

D. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.

1. Colored Mortar Aggregates: Ground marble, granite, or other sound stone, as required to match sample approved by the Commissioner.

E. Aggregate for Grout: ASTM C 404.

F. Colored Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.

G. Water: Clean and drinkable.

H. Products: Subject to compliance with requirements, provide one of the following:

1. Colored Mortar

a. "Colorbond Custom Color Masonry Cement," Centurion.
b. "Atlas Custom Color Masonry Cement," Lehigh Portland Cement Co.

c. "Flamingo Color Masonry Cement," Capital Materials Corporation.
d. or approved equal

2. Colored Mortar Pigments

a. "Centurion Pigments," Centurion.
b. "True Tone Mortar Colors," Davis Colors, A Subsidiary of Rockwood Industries, Inc.
c. "SGS Mortar Colors," Solomon Grind-Chem Services, Inc.
d. or approved equal

2.4 REINFORCING STEEL

A. General: Provide reinforcing steel complying with requirements of referenced unit masonry standard and this article.

B. Steel Reinforcing Bars: Material and grade as follows:

1. Billet steel complying with ASTM A 615.

2. Grade 60.

C. Deformed Reinforcing Wire: ASTM A 496.

D. Plain Welded Wire Fabric: ASTM A 185.

E. Deformed Welded Wire Fabric: ASTM A 497.

2.5 JOINT REINFORCEMENT

A. General: Provide joint reinforcement for concrete block complying with requirements of referenced unit masonry standard and this article, formed from the following:

1. Galvanized carbon steel wire, coating class as required by referenced unit masonry standard for application indicated.

B. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:

1. Wire Diameter for Side Rods: 0.1483 inch (9 gage).

2. Wire Diameter for Cross Rods: 0.1483 (9 gage).

3. For single-wythe masonry provide type as follows with single pair of side rods:

a. Truss design with continuous diagonal cross rods spaced not more than 16 inches o.c.

C. Manufacturers: Subject to compliance with requirements, provide joint reinforcement by one of the following:

1. AA Wire Products Co.

2. Dur-O-Wal, Inc.

3. Heckman Building Products, Inc.

4. Hohmann & Barnard, Inc.

5. Masonry Reinforcing Corp. of America.

6. National Wire Products Industries.

7. Southern Construction Products, Inc.

8. or approved equal

2.6 TIES AND ANCHORS, GENERAL

A. General: Provide ties and anchors specified in subsequent articles that comply with requirements for metal and size of referenced unit masonry standard and of this article.

B. Galvanized Carbon Steel Wire: ASTM A 82, coating class as required by referenced unit masonry standard for application indicated.

C. Galvanized Steel Sheet: As follows:

1. ASTM A 526 (commercial quality), Coating Designation G60, steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication, for sheet metal ties and anchors completely embedded in mortar.

2. ASTM A 366 (commercial quality) cold-rolled carbon steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153, Class B2 (for unit lengths over 15 inches) and Class B3 (for unit lengths under 15 inches), for sheet metal ties and anchors exposed to the weather and not completely embedded in mortar and grout.

D. Galvanized Steel Sheet: ASTM A 366 (commercial quality) cold-rolled carbon steel sheet, hot-dip galvanized after fabrication to comply with ASTM A 525, CB2 (for unit lengths over 15 inches) and Class B3 (for unit lengths under 15 inches), for sheet metal ties and anchors.

E. Galvanized Heavy-Thickness Steel Sheet: ASTM A 635 (commercial quality) hot-rolled carbon steel sheet hot-dip galvanized after fabrication to comply with ASTM A 526, Class B3, for rigid anchors fabricated from steel sheet or strip with a thickness of 0.180 inch and greater.

F. Steel Plates and Bars: ASTM A 36, hot-dip galvanized to comply with ASTM A 123 or ASTM A 153, Class B3, as applicable to size and form indicated.

2.7 ANCHORS AND TIES

A. For anchoring clay facing blocks to back-up masonry wall:

1. For horizontal cell facing units provide and install adjustable two wythe wall reinforcement type "Hook-It" made by Hohmann and Barnard or approved equal. Finish to be hot-dip galvanized.

a. Inner wythe to be truss box mesh type with 9 gauge rods.
b. Outer wythe to be ladder reinforcement type with 9 gauge rods.

2. For vertical units provide and install dowels and ties made by Hohmann and Barnard or approved equal. All pieces to be stainless steel (Type 302).

a. Half bond ties 7-5/8" x 3" x 1/4" diameter in back-up wall.
b. Solid 1/4" diameter x 2" long dowels.
c. Wire of 3/16" diameter cut to length as required.

B. For anchoring masonry to cold formed metal framing, provide hot dip galvanized steel anchors with 9 ga. wire equal to "X-Seal Veneer Anchor" with "X-Seal Tape" seals as manufactured by Hohmann & Barnard or approved equal.

2.8 ADJUSTABLE ANCHORS FOR CONNECTING MASONRY TO STRUCTURAL FRAMEWORK

A. General: Two-piece assemblies as described below allowing vertical or horizontal differential movement between wall and framework parallel to plane of wall, but resisting tension and compression forces perpendicular to it.

B. For anchorage to concrete framework, provide manufacturer's standard with dovetail anchor section formed from sheet metal and triangular-shaped wire tie section sized to extend within 1 inch of masonry face.

C. For anchorage to steel framework provide manufacturer's standard anchors with crimped 1/4-inch-diameter wire anchor section for welding to steel and triangular-shaped wire tie section sized to extend within 1 inch of masonry face and as follows:

1. Wire Diameter: 0.25 inch.

2.9 MISCELLANEOUS ANCHORS

A. Unit Type Masonry Inserts in Concrete: Cast iron or malleable iron inserts of type and size indicated.

B. Dovetail Slots: Furnish dovetail slots, with filler strips, of slot size indicated, fabricated from 0.0336-inch (22-gage) sheet metal.

C. Anchor Bolts: Steel bolts complying with A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations:

1. Headed bolts.

2.10 POST-INSTALLED ANCHORS

A. Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.

1. Type: Expansion anchors.

2. Corrosion Protection: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

3. For Cast-In-Place and Post-Installed Anchors in Concrete: Capability to sustain, without failure, a load equal to 4 times loads imposed by masonry.

4. For Post-Installed Anchors in Grouted Concrete Masonry Units: Capability to sustain, without failure, a load equal to 6 times loads imposed by masonry.

2.11 METAL FLASHING

A. Provide stainless steel flashing conforming to requirements specified in Section 076200, "Sheet Metal Work."

2.12 MISCELLANEOUS MASONRY ACCESSORIES

A. Nonmetallic Expansion Joint Strips: Premolded filler strips complying with ASTM D 1056, Type 2 (closed cell), Class A (cellular rubber and rubber-like materials with specific resistance to petroleum base oils), Grade 1 (compression-deflection range of 2-5 psi), compressible up to 35 percent, of width and thickness indicated, formulated from the following material:

1. Neoprene.

2. Urethane.

3. Polyvinyl chloride.

B. Preformed Control Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. Styrene-Butadiene Rubber Compound: ASTM D 2000, Designation 2AA-805.

C. Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type 1 (No. 15 asphalt felt).

D. Weep Holes: Provide clear plastic weep holes 3/8" wide and 1-1/2" high by four (4) inches long with insect screen equal to No. 342S made by Hohmann & Barnard or approved equal manufacturer listed above.

E. Cavity Drainage Material: Provide 10" HDPE "Mortar Net" open mesh mortar net of full width of masonry cavity shown at all horizontal thru wall flashing and shelf angle on drawings manufactured by Hohmann & Barnard, "Mortar Maze" made by Advanced Building Products, or approved equal.

F. EPDM Closure Strips: Provide product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637, 0.040-inch thick.

2.13 MASONRY CLEANERS

A. Clean masonry and stone surfaces using high pressure (1500 psi) water. Should contaminants remain on walls provide acidic cleaner as noted below.

B. Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.

1. For masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface-acting acids, chelating, and wetting agents.

2. For dark colored masonry not subject to metallic oxidation stains, use formulation consisting of a liquid blend of surface-acting acids and special inhibitors.

3. For masonry subject to metallic oxidation stains, use formulation consisting of a liquid blend of organic and inorganic acids and special inhibitors.

4. Products: Subject to compliance with requirements, provide the following:

   a. "Sure Klean No. 600 Detergent," ProSoCo, Inc.
   b. "Sure Klean No. 101 Lime Solvent," ProSoCo, Inc.
   c. "Sure Klean Vana Trol," ProSoCo, Inc.
   d. or approved equal

5. Completely remove all traces of acid cleaner after cleaning is complete and prior to application of water repellent.

6. Test solutions prior to start of cleaning at concealed area as approved by Commissioner.

2.14 MASONRY SEALERS

A. "Sure Klean Weather Seal Siloxane WB" concentrated water repellent as manufactured by ProSoCo, or equivalent product of Thoro, Trojan, or approved equal; clear, solvent-free silicone/siloxane blend formulated to weatherproof masonry units without altering their natural appearance, and providing UV stability. Apply with low-pressure spray, brush or roller.

1. Masonry sealer must be chemically resistant to the following cleaning products:

   a. "RX 101 All-Purpose Cleaner with Airicide" by Airex Laboratories and equal.
   b. "Trifectant" by Vétoquinol USA and equal.

2.15 MORTAR AND GROUT MIXES

A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, antifreeze compounds, or other admixtures, unless otherwise indicated below.

1. W. R. Grace "Dry Block" admixture or approved equal shall be included in the mortar mix.

2. Do not use calcium chloride in mortar or grout.

B. Mortar for Unit Masonry: Comply with ASTM C 270, for job-mixed mortar and ASTM C 1142 for ready-mixed mortar, of types indicated below:

1. Limit cementitious materials in mortar to Portland cement-lime.

2. For masonry below grade and in contact with earth, and where indicated, use type indicated below:

a. Type S.

3. For reinforced masonry, load bearing masonry, and where indicated, use type indicated below:

a. Type S.

4. For exterior, above-grade non-load bearing walls and parapet walls; for interior non-load bearing partitions, and for other applications where another type is not indicated, use type indicated below:

a. Type N.

C. Colored Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required.

D. Colored Aggregate Mortar: Produce mortar of color required by use of colored aggregates in combination with selected cementitious materials.

1. Mix to match sample approved by the Commissioner.

E. Grout for Unit Masonry: Comply with ASTM C 476 and referenced unit masonry standard.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Contractor present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.

B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with referenced unit masonry standards and other requirements indicated applicable to each type of installation included in Project.

B. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.

C. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.

D. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.

E. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Us full-size units without cutting where possible.

F. Built-In Work

1. As the work progresses, build in items specified under this and other Sections of these specifications. Fill in solidly with masonry around built-in items.

2. Mortar in door frames, access doors, louvers and other metal items embedded or built into masonry work solidly with mortar as the masonry units are laid up.

3. Grout under lintels, bearing plates, and steel bearing on masonry with solid bed grout.

4. Sleeves, pipes, ducts and all other items which pass through masonry walls shall be caulked with interior grade sealant meeting requirements of Section 079200, so as to be air tight and prevent air leakage. Refer to Section 078413 for packing of voids in rated masonry walls.

5. Fill vertical cells of masonry units solid with grout which have anchoring, reinforcing rods, supporting or hanging devices embedded in the cell including stone anchors and window or curtain wall anchors.

6. Fill vertical cells of masonry units solid with mortar on each side of door frames to sixteen (16) inches beyond.

7. Unless otherwise noted, fill vertical cells of masonry units solid with grout which are below steel bearing plates, steel beams, and ends of lintels, to eight (8) inches beyond bearing and from floor to bearing.

8. Place wire mesh in horizontal joint below masonry unit cells to be filled with mortar, to prevent mortar from dropping into unfilled cells below.

9. Masonry indicated as being reinforced shall have all voids filled solid with grout. Grout shall be consolidated in place by vibration or other methods which insure complete filling of cells. When the least clear dimension of the grouted cell is less than two (2) inches, the maximum height of grout pour shall not exceed twelve (12) inches. When the least clear dimension is two (2) inches or more, maximum

height of grout pour shall not exceed forty-eight (48) inches. When grouting is stopped for one (1) hour or longer, the grout pour shall be stopped 1-1/2" below the top of a masonry unit. Vertical bar reinforcing shall be accurately placed and held in position while being grouted, and shall be in place before grouting starts. All such reinforcing shall have a minimum clear cover of 5/8". Lap all bars a minimum of forty (40) bar diameters and provide steel spacer ties (not to exceed 192 bar diameter) to secure and position all vertical steel and prevent displacement during grouting. Provide continuous horizontal reinforcement embedded in mortar joints every second course.

G. Cutting and Patching

1. All exposed masonry which requires cutting or fitting shall be cut accurately to size with motorized carborundum or diamond saw, producing cut edges.

2. Do not saw cut any masonry openings in face brick construction without Commissioner's approval and after a procedure has been reviewed and approved.

3. Holes made in exposed masonry units for attachment of handrail brackets and similar items shall be neatly drilled to proper size.

4. All masonry which requires patching in exposed work, if approved by Commissioner, shall be patched neatly with mortar to match appearance of masonry as closely as possible and to the Commissioner's satisfaction. Rake back joints and use pointing mortar to match as required.

3.3 CONSTRUCTION TOLERANCES

A. Comply with construction tolerances specified herein and referenced standards.

3.4 LAYING MASONRY WALLS

A. Lay outer walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.

B. Lay up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.

C. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

1. One-half running bond with vertical joint in each course centered on units in courses above and below.

2. As indicated on drawings.

D. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

E. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly (if required), and remove loose masonry units and mortar prior to laying fresh masonry.

F. Built-In Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

3. Fill cores in hollow concrete masonry units with grout 3 courses (24 inches) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

3.5 CAVITY WALLS

A. All exterior masonry walls, unless otherwise indicated, shall be cavity walls of thickness indicated.

B. Cavity walls shall be securely tied together by horizontal joint reinforcement and ties anchored to reinforcement, as herein specified, spaced every other block course.

1. Where cavity back-up is concrete use ties specified herein spaced sixteen (16) inches o.c. both directions.

C. Cavity between facing and backing wall shall be kept clean and clear of all mortar droppings, and no mortar ledges shall project into the cavity. Temporary wood strips, cut to width of cavity and fitted with lift-up wires, shall be laid on the joint reinforcement and carefully lifted out before placement of the next layer of reinforcement. Any projecting mortar shall be spread over the back of the outer wythe immediately following the setting of the masonry unit.

1. Cavity drainage material shall be installed at the bottom of each cavity over the flashing to protect weep holes.

D. At cavity and solid walls adjacent to window openings fill block solid with mortar where window anchors are to be located. Coordinate with window subcontractor.

E. Concrete block back-up at cavity wall construction shall be anchored to slab as indicated in structural drawings.

F. Anchor CMU back-up with anchors as specified herein.

G. Refer to Section 072100, "Thermal Insulation," for material and installation of cavity wall insulation and drainage board.

3.6 INTERIOR BLOCK PARTITIONS

A. Build to full height unless otherwise shown on drawings. At non-rated partitions fill void between CMU and structural deck with continuous neoprene filler conforming to

the requirements of Section 079200. At fire rated partitions, fill void with fire stop material meeting the requirements of Section 078413. Fasten to structure at top of partition using steel angles as specified herein.

B. Provide continuous horizontal joint reinforcing every other block course, except as otherwise noted. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8". Lap reinforcement a minimum of six (6) inches at ends of units.

C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

D. Corners

1. First course above floor to be square-edged corner units to allow for proper base installation.

2. Provide interlocking masonry unit bond in each course at corners.

3. Provide continuity at corners with prefabricated "L" reinforcement units, in addition to masonry bonding.

E. Intersecting and Abutting Walls

1. Unless vertical control joints are shown as part of structural frame, provide interlocking masonry bond. Provide starters and special shapes as shown on the drawings to bond these walls.

2. In addition to masonry bonding, provide horizontal reinforcement using prefabricated "T" units at interior partitions.

3.7 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.

2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.

3. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

B. Cut joints flush for masonry walls to be concealed or to be covered by other materials, unless otherwise indicated.

3.8 HORIZONTAL JOINT REINFORCEMENT

A. General: Provide continuous horizontal joint reinforcement in CMU every other block course unless otherwise indicated. Install longitudinal side rods in mortar for their

entire length with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6".

B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, off sets, column fireproofing, pipe enclosures, and other special conditions.

3.9 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.

2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24" o.c. vertically and 36" o.c. horizontally.

3.10 MOVEMENT (CONTROL AND EXPANSION) JOINTS

A. General: Install control and expansion joints in unit masonry where indicated. Build in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in plane restraint of wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Fit bond breaker strips into hollow contour in ends of block units on one side of control joint. Fill the resultant core with grout and rake joints in exposed faces.

2. Install preformed control joint gaskets designed to fit standard sash block.

3. Install special shapes designed for control joints. Install bond breaker strips at joint. Keep head joints free and clear of mortar or rake joint.

C. Build in horizontal pressure relieving joints where indicated; construct joints by either leaving an air space or inserting non-metallic 50% compressible joint filler of width required to permit installation of sealant and backer rod specified in Division 7 Section "Joint Sealers".

1. Locate horizontal pressure relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

3.11 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide or formed in place masonry lintels. Cure precast lintels before handling and installation. Temporarily support formed in place lintels.

1. For hollow concrete masonry unit walls, use specially formed bond beam units with reinforcement bars placed as indicated and filled with coarse grout.

C. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

3.12 FLASHING/WEEP HOLES

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.

B. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing. Place through wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer before covering with mortar.

C. Install flashings as follows:

1. At lintels and shelf angles, extend flashing a minimum of 4" into masonry at each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4" in the cavity, and through the inner wythe to within 1/2" of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2", unless otherwise indicated.

2. At heads and sills, extend flashing as specified above unless otherwise indicated but turn up ends not less than 2" to form a pan.

3. Install flashing in masonry veneer walls as specified above but carry flashing up face of sheathing at least 8".

4. Install flashing in accordance with requirements stated in Article 3.8 herein for installation of vapor barrier.

5. Cut off flashing flush with face of wall after masonry wall construction is completed.

D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashings and as follows:

1. Form weep holes with product specified in Part 2 of this Section.

2. Space weep holes 16" o.c.

3. In insulated cavities/air spaces cover cavity/air space side of open weep holes with copper or plastic insect screening before placing loose fill masonry insulation in cavity.

E. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

3.13 INSTALLATION OF REINFORCED UNIT MASONRY ASSEMBLIES

A. General: Install reinforced unit masonry to comply with requirements of referenced unit masonry standard.

B. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

C. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

D. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

3.14 FIELD QUALITY CONTROL

A. Testing Frequency: Tests and evaluations listed in this article will be performed by the Contractor's Independent Testing Agency during construction for each 5000 sq. ft. of wall area or portion thereof.

1. Mortar properties will be tested per property specifications of ASTM C 270.

2. Mortar composition and properties will be evaluated per ASTM C 780.

3. Grout compressive strength will be sampled and tested per ASTM C 1019.

B. Prism Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM E 447, Method B, and as follows:

1. Prepare one set of prisms for testing at 7 days and one set for testing at 28 days.

C. Results of test shall be submitted to the Commissioner in writing.

D. Evaluation of Quality Control Tests: In absence of other indications of non-compliance with requirements, masonry will be considered satisfactory if results from construction quality control tests comply with minimum requirements indicated.

3.15 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.

C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Commissioner's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and non-masonry surfaces from contract with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.

4. If high pressure water cleaning is not adequate, clean brick by means of bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised" using the following masonry cleaner:

   a. Job mixed acidic solution.

5. Clean concrete masonry by means of cleaning method indicated in NCMA TEK 45 applicable to type of stain present on exposed surfaces.

6. Completely remove all cleaning agents prior to application of clear water repellent.

D. Protection: Provide final protection and maintain conditions, in a manner acceptable to installer, that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

E. Sealer: Per Section 079200.

END OF SECTION

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SECTION 051200

STRUCTURAL STEEL

PART 1.0 – GENERAL

1.01 DESCRIPTION OF WORK

A. The structural steel required for this work is indicated on the Drawings and specified herein. It includes the supply, fabrication, surface treatment and corrosion protection, erection and temporary bracing of the structural steel. The work includes but is not necessarily limited to the following:

1. All structural steel framing including beams, girders, columns, and bracing.

2. All other steel shown on the structural drawings.

3. Base plates and supply of embedded anchor bolts and other embedded steel connectors. The setting of these items is included under the "Cast in Place Concrete or Masonry" Section.

4. All steel framing, except as noted shall not be painted, but shall be surfaced cleaned and painted, except as otherwise noted.

5. Expansion and epoxy bolts drilled into existing walls, beams and slabs for connection of new steel.

6. Masonry ties connected to the steel framing.

7. Providing temporary bracing for the erection of the steel framing as required.

8. Grouting is not included in this work. It is included in the "Cast in Place Concrete" work.

B. "Structural Steel" is that work itemized above, and in the AISC Code of Standard Practice, and all steel shown on the structural drawings.

C. Related Work Described Elsewhere:

1. Cast In Place Concrete - Section 033000

2. Metal Deck - Section 053000

3. Unit Masonry - Section 042000

1.02 QUALITY ASSURANCE

A. Code Compliance:

The work must comply with the following standard Specifications and Codes except where otherwise indicated in the plans and herein.

1. NYC Building Code - latest edition.

2. The following codes and specifications of the American Institute of Steel Construction, Ninth Edition, ASD Version, plus all current supplements:

   a. "Code of Standard Practice" and Commentary.

   b. "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", its Commentary and all Appendices.

   c. "Structural Joints Using ASTM A325 or A490 Bolts".

   d. "Specifications for Architecturally Exposed Structural Steel".

3. American Welding Society - "Structural Welding Code AWS D1.1- ", latest Edition.

4. Steel Structure Painting Council - Painting Manual, Vol. 1 and 2, latest edition.

5. American Society for Testing and Materials (ASTM)

   a. ASTM A6 - "General Requirements for Delivery of Rolled Steel Plates, Shapes, Steel Piling and Bars for Structural Use".

   b. Other specifications as referenced herein.

6. All applicable state, federal and local codes with regards to means and methods of construction, workman safety and environmental protection.

In the event of conflict between any of the above referenced Specifications and Codes, the provisions of the more stringent shall govern.

B. Qualifications of Suppliers and Personnel:

1. The Contractor shall have not less than five years continuous experience in the fabrication and erection of structural steel. The steel plant shall have been approved by the AISC Quality Certification Program, Categories II, and I and is currently in use.

2. The steel erector shall have not less than five years continuous experience in the erection of structural steel.

C. Testing:

1. For purposes of verifying that the structural steel work complies with the requirements of the contract documents, the Owner shall retain an independent testing laboratory, acceptable to the Engineer, to provide non-destructive testing and inspection of the steel and welding as specified below. The independent inspector shall be paid for by the Owner, except that the cost of retesting any

rejected welds, connections or other steel, or testing required beyond that described herein because of poor workmanship, shall be paid for by the Contractor.

2. The Contractor shall furnish the Testing Laboratory, free of charge, the following:

   a. A complete set of approved erection drawings and shop drawings.

   b. Representative sample pieces requested for testing.

   c. Full and ample means and assistance for testing all material and proper facilities and access, including scaffolding, temporary work platforms, etc. for inspection of the work in the mill, shop and in the field.

3. The Engineer and the Independent Testing Laboratory Inspector shall have the privilege of inspecting the work in the shop or field anytime during the period of fabrication or erection. The weld testing will largely be done in the shop. However, the Owner shall retain the privilege of testing in the field, particularly if any visible defects are found in the welds in the field.

4. The Testing Laboratory Inspector shall check for workmanship of steel, both in the shop and field, and check general compliance with the Contract Documents and steel shop drawings. He shall test welded and bolted connections as outlined below. The Inspector shall record types and locations of all defects found in the work and the measures required and performed to correct such defects.

5. The Independent Testing Laboratory Inspector shall submit reports of his inspection and test findings to the Engineer. He shall record all defects found with subsequent repair operations and submit reports to the Engineer.

6. The work of the Independent Testing Laboratory Inspector shall in no way relieve the Contractor of his responsibility to comply with all the requirements of the Contract Documents. The Contractor shall remain responsible for all defects in the material and workmanship of the steel and welding regardless of the work of the Independent Testing Laboratory.

7. The Contractor shall provide his own quality control procedures to assure that the steel and welding meet the requirements of the contract documents. The independent testing laboratory, paid for by the Owner, shall provide verification inspections and testing, as specified in the AWS D1.1- Code.

8. The Independent Testing Agency shall test the welded connections by non-destructive testing as follows:

a. All complete joint penetration groove welds shall be tested.

   b. All other shop and field welds shall be visually inspected and spot tested (10 to 20% of the welds) by non-destructive methods.

c. All weld testing and acceptance criteria shall be in accordance with the AWS D1.1-Code.

9. The independent testing laboratory shall check all high strength friction type bolt installations for compliance to the AISC Code, and submit the necessary reports to the Engineer.

10. Non-destructive testing shall be done by the following methods:

a. Groove welds in butt joints - radiographic or ultrasonic.

b. Groove welds in tee or corner joints - ultrasonic.

c. Fillet welds - Magnetic particle.

For additional requirements and acceptance criteria, refer to AWS D1.1.

1.03 SUBMITTALS

A. Shop Drawings:

1. The Contractor shall submit shop drawings to the Engineer for review.

2. The drawings shall show all shop and erection details including cuts, copes, connection holes, threaded fasteners, bolts, studs and spacing, etc.

3. The drawings shall show all welds, both shop and field, by the currently recommended symbols of the American Welding Society.

4. Erection plans shall be drawn to a scale of at least 1/16" to the foot with section and detail drawings to a larger scale. The detail drawings, shall show all dimensions and details of all structural steel work.

5. The Contractor shall not fabricate any material until after the Engineer's review and approval of the shop drawings, nor proceed with any work for which such drawings are required until they have been reviewed. Erection drawings shall be submitted for review first, and no detail shop drawings shall be submitted until the erection plans have been reviewed.

6. Shop drawings shall be carefully checked before being submitted to the Engineer for review, and shall be submitted in the order in which they are needed for the execution of the work, well in advance and not all at one time. Submitted drawings shall show all structural steel required for the work, whether or not indicated on the drawings.

7. The Contractor shall immediately make all corrections to his drawings as required by changes ordered or authorized by the Engineer and shall keep a satisfactory history of all changes by separately numbered and dated modification on a convenient portion of each drawing affected.

B. Proofs of Compliance:

The Contractor shall furnish an affidavit from the producer of the steel certifying that the steel meets the minimum requirements as specified. If no mill tests are furnished, the Contractor shall pay for any tests required by the Engineer to show compliance.

C. Proofs of Qualification:

Within five days after award of Contract, submit to the Engineer evidence satisfactory to him that the steel fabricator and steel erector are qualified for the work in accordance with the requirements of the Section of these Specifications.

D. Manufacturers Literature:

Provide copies of manufacturer's specifications and installation instructions for the following products:

1. High Strength Bolts.

2. All Paints.

1.04 PRODUCT HANDLING

A. Protection:

Use all means necessary to protect structural steel before, during and after installation and to protect the installed work and materials of all other trades.

1.05 REJECTION AND REPLACEMENT

A. Any material and workmanship in the steel fabrication and erection found not meeting the requirements of the contract documents, in the shop or field, by the independent testing laboratory or the Engineer, shall be repaired by the Contractor at his cost, with no additional cost to the Owner.

B. In the event of damage to the steel, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and the testing laboratory and at no additional cost to the Owner.

PART 2.0 - PRODUCTS

2.01 STRUCTURAL STEEL SHAPES AND PLATES

Structural steel shapes, plates and anchor bolts shall conform to the requirements of ASTM A-992. GR.50.

2.02 STRUCTURAL STEEL PIPE

Structural steel pipe shall conform to the requirements of ASTM A53, Type E or S, Grade B, or ASTM A501.

2.03 STRUCTURAL STEEL TUBING

Structural steel tubing shall conform to ASTM A-500, Grade B.

2.04 STRUCTURAL BOLTS

A. High strength bolts, ASTM A-325, to be used typically unless noted otherwise. Bolts to be in bearing type connections unless called for as slip critical (S.C.) on the drawings.

B. Common bolts: ASTM A-307 only where specifically noted on the drawings.

2.05 ELECTRODES

Welding electrodes shall be E70XX, low hydrogen.

2.06 PAINT TNEMEC 99, or approved equal.

2.07 SUBSTITUTIONS

Any material substitutions for the above products may only be done by written approval of the Engineer.

2.08 OTHER MATERIALS

All other materials, not specifically described but required for a complete and proper installation of structural steel, shall be provided and shall be new, free from rust, first quality of their respective kinds, and subject to the approval of the Engineer.

PART 3.0 - EXECUTION

3.01 FABRICATION

A. Workmanship and Tolerances:

1. All members when finished shall be true and free of twists (see below), bends, and open joints between their component parts. Members shall be thoroughly straightened in the shop as required, by methods, which will not injure them, before being worked on in any way.

2. All tolerances (mill, fabrication, and erection tolerances) shall be as per the referenced AISC Specifications and Codes, unless noted otherwise herein or on the drawings.

3. All steel in this project shall be considered "Architecturally Exposed Structural Steel" and shall be built to the tolerances as provided in the AISC Code of Standard Practice, for this steel.

B. Connections:

1. Connections shall be as indicated on the drawings. Any deviations from the details shown on the drawings shall not be allowed without the approval of the Engineer. When details are not shown or incomplete on the drawings, they shall be designed by the Contractor and approved by the Engineer. The framing connections not shown on the drawings shall conform to the requirements for AISC standard double angle framed beam shear connections unless noted as

moment connections on the drawings. Shear connections shall be designed to develop the allowable uniform load on the beam span, unless a specific load is given on the drawings. Moment connections shall be designed to develop the full moment capacity of the smaller member joined, unless a specified moment is given in the drawing. One-sided or other type of eccentric connections shall not be used except where indicated on the drawings. All connections designed by the Contractor shall be reviewed by the Engineer.

2. Combination of bolts and welds in the same connection are not permitted, unless otherwise detailed.

3. Field connections shall be bolted, unless otherwise detailed. Shop connections shall be bolted or welded.

4. The high strength bolts used shall have a suitable identifying mark placed on top of the head before leaving the factory. The method of torqueing high strength bolts shall be as permitted by AISC, and as approved by the Engineer. The Contractor shall identify his method of torqueing on a submittal to the Engineer prior to any erection.

5. Splices in all continuous elements shall not be permitted unless shown and detailed on the shop drawings and approved by the Engineer. The Engineer reserves the right to reject any splices he feels can be avoided. The splices permitted in these continuous elements shall be made with complete joint penetration groove welds in the shop & fully tested and approved as specified herein.

6. Welded Connections:

   a. Definitions - All terms herein relating to the welds, welding and oxygen-cutting shall be construed in accordance with the standard Definitions of Welding Terms and Master Chart of Welding Processes of the American Welding Society, as amended at the time of bidding.

   b. Operators - Welds shall be made only by operators who have been previously qualified by tests, as prescribed in AWSD1.1, to perform the specific type of welding work required. The independent testing agency shall review the welder's certifications prior to the work.

   c. All welders working on the project will be assigned by an identifying symbol or mark. Each welder will be required to mark or stamp his symbol on each weldment completed for identification. Contractor shall maintain a record of welders employed, date of qualification and symbol or identification mark assigned to each.

   d. Welding equipment shall be of sufficient capacity and maintained in good working condition, capable of adjustment in full range of current settings. Welding cables shall be of adequate size for the currents involved and grounding methods shall be such as to insure proper machine operation.

e. No welding shall begin until joint elements are clamped in proper alignment and adjusted to dimensions shown on the drawings with allowances and corrections for any weld shrinkage that is expected to minimize distortions, twists, bends, etc. of all the elements. Fabrication tolerances of the welded assemblies shall not exceed those indicated in Section 3.01A.

f. All welding shall be done in accordance with the reference specifications, with the following modifications and additions:

1. All shop welding shall be done by either manual shielded metal-arc welding or submerged arc welding. Other welding processes must be approved by the Engineer.

2. All field welding shall be done by manual shielded metal-arc welding.

3. All groove welds shall be complete joint penetration groove welds unless otherwise specified on the drawings.

4. All complete joint penetration groove welds and partial joint penetration groove welds shall be the prequalified welds as indicated in Section 2 of the AWS D1.1- Code.

5. The minimum preheat and interpass temperature requirements shall be as per the "Structural Welding Code".

6. Welding of all shear studs on beams shall be done by automatic welding equipment and in compliance with the AWS-D1.1 Code.

g. When welding galvanized members, the galvanizing shall be ground off all welded surfaces prior to welding.

C. Oxygen Cutting:

1. Manual oxygen cutting shall be done only with a mechanically-guided torch. Alternatively, an un-guided torch may be used provided the cut is not within 1/2 inch of the finished dimension and the final removal is completed by chipping or grinding to produce a surface quality equal to that of the base metal edges.

2. Oxygen cutting of structural steel in the field by the structural steel Contractor shall not be done except with the written consent and approval of the Engineer. The use of oxygen-cut holes for bolted connections, will under no circumstances be permitted, and violation of this clause will be sufficient cause for the rejection of any pieces in which oxygen cut holes exist.

D. Anchor Bolts and Base Plates:

1. Furnish anchor bolts and other connectors required for securing steel to the foundations and other in-place work.

2. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.

3. Refer to Division 3 of these Specifications for anchor bolt installation requirements in concrete, and Division 4 for masonry installation.

3.02 SURFACE PREPARATION OF STRUCTURAL STEEL

A. Surface Preparation:

Thoroughly clean steel of all loose mill scale, loose rust, spatter, slag and flux deposit, oil, dirt, grease and other foreign matter. Use the following method of cleaning:

1. Commercial Sand Blasting, SSPC-SP-6, or Hand Tool Cleaning SSPC-SP-2, or Power Tool Cleaning SSPC-SP-3 for all steel.

B. Painting:

1. Apply paint by brushing or spraying.

2. Apply two coats (3 mils each) coat to all steel.

3.03 ERECTION

A. The Contractor shall employ a competent and experienced foreman (foremen) to supervise all work of erection. This foreman (foremen) shall be present at all times during this phase of the work.

B. The steel shall be carried up true and straight and temporary bracing shall be introduced wherever necessary to take care of all loads to which the structure may be subjected during erection, including loads from erection equipment and its operations, live loads, and wind loading.

The structure is designed to be self-supporting and stable only after the building structure is fully completed, including the masonry shear walls. It is the Contractor's sole responsibility to determine erection procedure and sequence, and necessary bracing that is required to insure the safety of the building and its component parts during erection. This includes the addition of whatever temporary bracing, guys or tie-downs that might be necessary, all to be provided at the Contractor's cost. Such materials and their connections to the permanent steel must be removed by the Contractor and shall remain his property after completion of the project.

Temporary bracing shall be left in place as long as may be required for safety during construction. The bracing shall be located so it does not interfere with the erection of the remaining steel, and can be removed as required during construction.

C. All steel shall be accurately aligned before permanent connections are made.

D. The column base plates may be leveled by the use of leveling plates, shims, or leveling nuts, as approved by the Engineer.

E. Erection tolerances shall be specified in the AISC Code unless otherwise indicated.

F. Any steel damaged during erection, or not in compliance with the design drawings or approved shop drawings, shall be repaired or replaced as the Engineer decides is necessary, and at the Contractor's cost.

END OF SECTION

SECTION 053000

METAL DECK

PART 1.0 - GENERAL

1.01 GENERAL REQUIREMENTS

Work of this Section shall conform to the requirements of the Contract Documents. Provide materials, labor, equipment and services necessary to furnish, deliver and install all work of this Section as shown on the drawings, as specified herein, and/or as required by the job conditions.

1.02 SCOPE OF WORK

A. Work Included:

This work includes, but is not necessarily limited to the following:

1. Acoustical cellular roof deck: 3NPA 18/18 Cellular Deck by Nucor Vulcraft Group or Equal. Submit product specifications for review and approval.

2. Deck accessories including all edge closures, fasteners and welding washers, shall be provided and installed.

3. Erection of all decks.

4. Furnishing setting plan for block outs and sleeves.

5. Cutting of openings where indicated on structural and architectural drawings.

6. Location drawings of openings provided by other trades.

B. Related Work Specified Elsewhere:

1. Structural Steel – Section 051200

C. Code Compliance:

Work must comply with the latest edition (unless noted) of the following standard Specifications and Codes with modifications as specified herein:

1. NYC Building Code, Latest Edition;

2. AISI-"Specifications for the Design of Cold Formed Steel Structural Members";

3. AWS-"Structural Welding Code AWS D1.1-95;

4. SDI- "Steel Deck Design Manual".

In the event of conflict between pertinent Codes and regulations, and the requirements of the referenced standards or these Specifications, the provisions of the more stringent shall govern.

D. Inspection:

1. Inspection of deck work including inspection of the field welding of the metal deck will be done by an independent testing agency hired by the Owner. The Contractor shall furnish the Inspector free of charge the following:

   a. A complete set of erection drawings and shop drawings;

   b. Information as to the time of welding; at least 5 working days advance notice.

   c. Proper facilities and access to work, including scaffolding, temporary work platforms, etc. for inspection of the work.

2. The Contractor shall make all repairs to defective work to the satisfaction of the Inspector and at no additional cost to the Owner.

3. The Inspector shall record types and locations of all defects found in the work and the measures required and performed to correct such defects.

4. The Inspector shall submit reports of his inspection and test findings to the Architect and Contractor.

1.03 SUBMITTALS

A. Shop Drawings:

1. The Subcontractor shall submit shop drawings to the Architect for approval in accordance with the General Conditions.

2. Shop drawings shall be carefully checked by the General Contractor before being submitted to the Architect for approval, and shall be submitted well in advance.

3. Shop drawings shall show clearly the size and location of each steel deck unit and each field connection.

B. Proof of Compliance:

Submit manufacturer's certification as may be required to show compliance with these Specifications.

C. Manufacturer's Data:

In the event that the specified deck manufacturer is not chosen, submit manufacturer's product catalog indicating section properties, load and span capacities and diaphragm shear values for the metal deck proposed. The decks must be equal to or of higher capacity to the ones specified herein and shall be subject to approval by the Architect.

1.04 PRODUCT HANDLING

Use all means necessary to protect metal decking before, during and after installation and to protect work of other trades. Deck shall be stored off the ground with one end elevated to provide drainage and shall be protected by a waterproof covering, and ventilated to avoid condensation.

1.05 REJECTION AND REPLACEMENT

A. In the event of damage to the deck, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

B. Any material or welding rejected by the Inspector must be promptly replaced to the Architect's satisfaction and at no additional cost to the Owner.

PART 2.0 - PRODUCTS

2.01 MATERIALS

A. The roof deck shall be Acoustic Cellullar Deck as manufactured by 'Nucor' or Equal. Alternate deck manufacturers shall be Canam or Epic. The manufacturer shall provide all techinacal data regarding the deck properties and performance. It shall be of the type, depth and gage, as shown on the drawings. The deck shall be galvanized. The deck assembly must have an acoustic NRC rating of 0.80 or higher. The stiffened liner panels at the underside of the acoustic deck assembly shall be made of galvanized steel, plus weldable primer, and shop applied finish paint color to match control sample selected by Architect.

B. The steel for the deck, all flashing, cell closures etc. shall be formed from steel sheets conforming to ASTM A-446-72. Before forming the sheets, coat with zinc coating conforming to ASTM A-525-71 and to Federal Specifications QQ-S-775d, Type 1, Class E.

C. Miscellaneous Steel Shapes: ASTM A-36.

D. Other Materials:

All other materials, not specifically described or required for a complete and proper installation of the work of this Section, shall be provided by the Contractor, and shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

PART 3.0 - EXECUTION

3.01 GENERAL

A. Deck units provided shall be of the type, gauge, depth and width as shown on the drawings.

B. Form deck units in lengths to span three or more supports with flush, telescoped or nested 2" laps at ends and interlocking or nested side laps, unless less than three supports are available. All decks to bear 2" minimum on supporting steel.

C. Provide tight fitting metal closure strips at all open ends of metal deck cells and in areas where deck changes direction of span. Strips shall be formed of not less than 16 gauge sheet metal.

D. Provide cell closures at all open ends of decks, and where decks change direction. Provide closure strips at all locations whether or not shown on the drawings. Closure strips are to be welded to deck.

3.02 INSTALLATION

A. Verification of Existing Construction:

All dimensions and conditions indicated on the drawings shall be verified at the site before fabrication or layout out of the work, and the Contractor shall be responsible for the correctness, adequacy, fit and alignment of the new work with the existing conditions.

B. Examination:

Installer must examine the areas and conditions under which metal decking is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

C. Placement:

1. Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.

2. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.

3. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.

4. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.

5. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

6. Do not use floor deck units for storage or working platforms until permanently secured.

D. Fastening:

1. Fasten deck to supporting steel with not less than 5/8" diameter effective puddle weld at each flute. Button punch or weld side laps at intervals not be exceed 36" on center.

2. All welding shall be in accordance with AWS Specifications. Welding operators shall be pre-qualified for this type of work as required in the AWS Code.

3. Powder Actuated Deck Fastening System may be used in place of welding. Submit fastening system specifications and shop drawing specific to the project.

E. Cutting and Fitting:

Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown on the drawings.

F. Holes and Openings:

1. Openings: Steel decking shall be cut by this Contractor to fit all structurally framed openings as specified under the "Scope".

2. Definitions for Openings: Openings shall be defined as the apertures through the steel decking such as openings for fans, scuttles, and the like, the framing of which will be furnished and installed under this Structural Steel Contract, as indicated on the drawings. Such structural steel framing shall provide adequate support with a minimum bearing of three (3) inches, unless otherwise shown.

3. Holes: Steel decking shall be cut by the respective trades as required to pass their work through the roof deck.

4. Definition of Holes: Holes shall be defined as any aperture cut through the steel flooring in unframed areas to accommodate sleeves for pipes, ducts, conduits and the like.

5. Reinforcing: All holes and openings cut through metal decking shall be reinforced under this Contract as previously specified under the "Scope", except that holes 6" or less in diameter, and holes in which the distance cut across a flute is 6" or less, need not be reinforced, provided adjacent holes are not closer than 2'-6" on center. Required reinforcing shall be U.S.S. No. 14 gauge sheet steel, 4"-5.4 lbs. steel channels or 3" x 3" x 1/4" steel angles respectively as shown and noted on the Structural drawings. All welds shall be a minimum of 3/4" in length and spaced not more than 8" on center.

END OF SECTION

SECTION 054000

COLD FORMED METAL FRAMING

PART 1.0 - GENERAL

1.01 GENERAL REQUIREMENTS:

Work of this Section shall conform to the requirements of the Contract Documents. Provide materials, labor, equipment and services necessary to furnish, deliver and install all work of this Section as shown on the drawings, as specified herein, and/or as required by the job conditions.

1.02 SCOPE OF WORK

A. Stud and joist framing members required for this work are indicated on the Drawings and includes, but is not necessarily limited to the following:

1. Furnishing and installing of all steel joists and studs as shown on the Drawings.

2. Connections, bridging, bracing, structural shapes, accessories and other incidental items necessary to complete the work.

B. Related work specified elsewhere:

1. Structural Steel - Section 051200

1.03 QUALITY ASSURANCE

A. Codes and Standards Compliance:

Work must comply with the latest edition of the following standard specifications and codes with the modifications as specified herein, provided however, that no requirement therein shall apply if it be in conflict with any provisions of the latest edition of the New York State Building Code.

1. American Iron and Steel Institute "Specification for the Design of Cold-Formed Steel Structural Members".

2. 2008 N.Y.C. Building Code.

B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure".

C. Inspection to determine Contract compliance of materials and installation will be made by an approved Testing Laboratory hired by the Owner.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for each type of studs, joists and accessories. Include manufacturer's certification that materials comply with referenced standards.

B. Shop Drawings: Submit detailed drawings showing layout of units, special connections, joining and accessories. Include mark, number, type, location and spacing of joists, studs, and bridging.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle the materials as recommended by the manufacturer. Handle and store in a manner to avoid deforming members and to avoid excessive stresses.

PART 2.0 - PRODUCTS

2.01 MATERIALS

A. All stud and joist framing members shall be of the type, size, and gauge as shown on the drawings.

B. All structural framing members shall be manufactured from galvanized steel sheet.

C. Galvanized steel used in the manufacture of Steel Joists, Studs and Lintels shall conform to ASTM designation A446 grade C (minimum yield point 40,000 psi) with hot dipped galvanized coating.

D. Galvanized steel runner track and miscellaneous accessories shall be formed with material meeting requirements of ASTM designation A446 grade A (minimum yield point 33,000 psi) with hop dipped galvanized coating.

PART 3.0 - EXECUTION

3.01 FABRICATION

A. Shop cutting shall be with a radial arm saw with a friction type blade.

B. All framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Members shall be held positively in place until properly fastened.

C. Axially loaded studs shall be installed in a manner which will assure that ends of the studs are positioned against the inside track web, prior to stud and track attachment.

D. Provide insulation equal to that specified elsewhere in all double jamb studs and double header members which will not be accessible to the insulation contractor.

3.02 INSPECTION

Erector must examine areas and conditions under which steel joists and studs are to be installed and notify the Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Erector.

3.03 ERECTION

A. Handling and lifting of prefabricated panels shall be done in a manner as to not cause distortion in any member.

B. Tracks shall be securely anchored to the supporting structure as shown on the plans, or in sections.

C. Complete uniform and level bearing support shall be provided for the bottom tracks.

D. At track butt joints, abutting pieces of track shall be securely anchored to a common structural element, or they shall be butt welded or spliced together.

E. Studs shall be plumbed, aligned and securely attached to the flanges or webs of both upper and lower tracks.

F. Framed wall openings shall include headers and supporting studs as required.

G. Jack studs shall be installed below window sills, above window and door heads, and elsewhere to furnish support and shall be securely attached to supporting members.

H. Temporary bracing shall be provided until erection is completed.

I. Wall stud bridging shall be installed in a manner to provide resistance to both minor axis bending and rotation. Bridging rows shall be equally spaced not to exceed 3'-4" on-center.

J. Splices in axially loaded studs shall not be permitted.

K. Erection of Cold-Formed Steel Joists:

1. Joists shall be located directly over bearing studs or a load distribution member shall be provided at the top track.

2. Provide web stiffeners at reaction points where indicated on plans.

3. Joist bridging shall be provided as shown on the plans or as indicated in the drawing notes.

4. End blocking shall be provided where joist ends are not otherwise restrained from rotation.

END OF SECTION

SECTION 055000

MISCELLANEOUS METALS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the miscellaneous metal work as indicated on the drawings and/or specified herein, including, but not limited to, the following:

1. Rough hardware.
2. Vertical steel ladders and ship's ladders.
3. Loose steel lintels.
4. Light steel framing and supports, not included as part of work of other trades.
5. Steel gratings and frames.
6. Stainless steel framing and fencing for runs.
7. Decorative fencing.
8. Welded galvanized pipe railings.
9. Miscellaneous steel trim, corner guards, angle guards and channels.
10. Masonry support steel.
11. Sleeves in concrete walls and slabs.

12. Aluminum supports for counters.

13. Aluminum and Anodized Aluminum finish panels.

14. Custom formed stainless steel diffuser with slotted perforations, at Cattery.

15. Steel framing, bracing, supports, anchors, bolts, shims, fastenings, and all other supplementary parts indicated on drawings or as required to complete each item of work of this Section.

16. Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.

17. Cutting, fitting, drilling and tapping work of this Section to accommodate work of other Sections and of concrete, masonry or other materials as required for attaching and installing work of this Section.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Structural steel - Section 051200.

H. Access doors - Section 083113.

I. Painting - Section 099000.

1.4 QUALITY ASSURANCE

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

C. Reference Standards: The work is subject to requirements of applicable portions of the following standards:

1. "Manual of Steel Construction," American Institute of Steel Construction.

2. AWS D1-1 "Structural Welding Code," American Welding Society.

3. SSPC SP-3 "Surface Preparation Specification No. 3, Power Tool Cleaning," Steel Structures Painting Council.

4. SSPC PA-1 "Painting Application Specification," Steel Structures Painting Council.

5. "Handbook on Bolt, Nut and Rivet Standards," Industrial Fasteners Institute.

D. Steel Materials: For steel to be hot dip-galvanized, provide steel chemically suitable for metal coatings complying with the following requirements: carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.

E. Engage the services of a galvanizer who has demonstrated a minimum of three years experience in the successful performance of the processes outlined in this specification in the facility where the work is to be done and who will apply the galvanizing and coatings within the same facility as outlined herein. The Commissioner has the right to inspect and approve or reject the galvanizer/galvanizing facility.

F. The galvanizer/galvanizing facility must have an ongoing Quality Control/Quality Assurance program which has been in effect for a minimum of three years and shall provide the Commissioner with process and final inspection documentation. The galvanizer/galvanizing facility must have an on-premise testing facility capable of measuring the chemical and metallurgical composition of the galvanizing bath and pickling tanks.

1. The galvanizer must be able to galvanize long sections and provide the specifed color gold/metallic yellow to match the Commissioner's sample.

G. Inspection and testing of hot-dip galvanized coating shall be done under the guidelines provided in the American Hot-Dip Galvanizers Association (AGA) publication "Inspection of Products Hot-Dip Galvanized After Fabrication."

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).

b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Manufacturer's Literature: Submit manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in the fabrication of miscellaneous metal work, including paint products.

C. Samples: Submit samples for all metal fabrications and finish pieces exposed to view including gold colored anodized aluminum.

D. Shop Drawings: Shop drawings for the fabrication and erection of all assemblies of miscellaneous iron work which are not completely shown by manufacturer's data sheets. Include plans and elevations at not less than 1" to 1'-0" scale, and include details of sections and connections at not less than 3" to 1'-0" scale. Show anchorage and accessory items.

E. Welding shall be indicated on shop drawings using AWS symbols and showing length, size and spacing (if not continuous). Auxiliary views shall be shown to clarify all welding. Notes such as 1/4" weld, weld and tack weld are not acceptable.

F. Certification: For items to be hot-dip galvanized, identify each item galvanized and to show compliance of application. The Certificate shall be signed by the galvanizer and shall contain a detailed description of the material processed and the ASTM standard used for the coating and, the weight of the coating. In addition, and as attachment to

Certification, submit reports of testing and inspections indicating compliance with the provisions of this Section.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Metals

1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

2. Steel Plates, Shapes and Bars: ASTM A 36.

3. Steel Bar Grating: ASTM A 1011/A or ASTM A 36.

4. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.

5. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.

6. Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.

7. Steel Pipe: ASTM A 53, type and grade as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.

8. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.

9. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.

10. Slotted Channel (Unistrut) Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

    a. Size of Channels: 1-5/8 by 1-5/8 inches, or as indicated on the Drawings.
    b. Material: Cold-rolled steel, ASTM A 1008, either commercial steel, Type B or structural steel, Grade 33; 0.060-inch minimum thickness; hot-dip galvanized after fabrication, with surface sanded and blast cleaned, as per requirements of this Section.
    c. Slotted channel framing members shall be from a new product lot. Framing obtained from an older lot that has been stored and subject to weathering shall not be accepted.

11. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

12. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

13. Stainless Steel: Type 316, ASTM A 666 and ASTM 4276.

    a. Custom Perforated Stainless Steel: Perforated stainless steel sheet or plate of thickness, size, and pattern indicated. Form perforations by punching, cutting, or drilling to produce openings of sizes and shapes indicated. Roll, press, and grind perforated metal to flatten and to remove burrs and deformations.

14. Aluminum

    a. Alloy and Temper: Provide alloy and temper as indicated or as otherwise recommended by the aluminum producer or finisher.
    b. Aluminum Extrusions, Bars and Shapes: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T6.
    c. Aluminum Plate and Sheet: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209, alloy 6061-T6.
    d. Class I Color Anodized Finish: AA-M12C22A42/A44, Smooth non-specular buffed mechanical finish; chemical etch, medium matte; 0.18 mil minimum thick integrally colored or electrolytically deposited coating conforming to AAMA 608.1 or 606.1; match approved sample for color.

B. Grout: Non-shrink, non-metallic grout conforming to the requirements of Section 033000.

C. Fasteners

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.

3. Anchor Bolts: ASTM F 1554, Grade 36.

4. Lag Bolts: ASME B18.2.1.

5. Machine Screws: ASME B18.6.3.

6. Plain Washers: Round, carbon steel, ASME B18.22.1.

7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.

8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.

9. Lock Washers: Helical spring type carbon steel, ASME B18.21.1.

D. Shop Paint: Shop prime all non-galvanized miscellaneous metal items using "Series 88 Azeron Primer" by Tnemec, "Rust Guard" quick dry alkyd shop coat No. 41403 by ICI Devoe, or "Interlac 393" by International Protection Coatings, or approved equal.

1. If steel is to receive high performance coating as noted in Section 099000, shop prime using primer noted in Section 099000.

E. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187.

F. Galvanizing Repair Coating: For touching up galvanized surfaces after erection, provide repair coating that is V.O.C. compliant, equal to "Silver Galv" made by Z.R.C. Worldwide or approved equal. Apply to a dry film thickness of 1.5 to 3.0 mils.

2.2 PRIME PAINTING

A. Scope: All ferrous metal (except galvanized steel) shall be cleaned and shop painted with one coat of specified ferrous metal primer. No shop prime paint required on galvanized steel or aluminum work.

B. Cleaning: Conform to Steel Structures Painting Council Surface Preparation Specification SP 3 (latest edition) "Power Tool Cleaning" for cleaning of ferrous metals which are to receive shop prime coat.

1. Steel to get high performance coating as noted in Section 099000 shall be cleaned as per SSPC SP.6 "Commercial Blast Cleaning."

C. Application

1. Apply shop prime coat immediately after cleaning metal. Apply paint in dry weather or under cover. Metal surfaces shall be free from frost or moisture when painted. Paint all metal surfaces including edges, joints, holes, corners, etc.

2. Paint surfaces which will be concealed after shop assembly prior to such assembly. Apply paint in accordance with approved paint manufacturer's printed instructions, and the use of any thinners, adulterants or admixtures shall be only as stated in said instructions.

3. Paint shall uniformly and completely cover the metal surfaces, 2.0 mils minimum dry film thickness. No work shall be shipped until the shop prime coat thereon has dried.

D. Touch-Up: In the shop, after assembly and in the field, after installation of work of this Section, touch-up damaged or abraded portions of shop prime paint with specified ferrous metal primer.

E. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.3 GALVANIZING

A. Scope: All ferrous metal exposed to the weather, and all ferrous metals indicated on drawings or in specifications to be galvanized, shall be cleaned and then hot-dipped galvanized after fabrication.

B. Avoid fabrication techniques that could cause distortion or embrittlement of steel items to be hot-dip galvanized. Fabricator shall consult with hot-dip galvanizer regarding potential warpage problems or handling problems during the galvanizing process that may require adjustment of fabrication techniques or design before finalizing shop drawings and beginning of fabrication.

C. Cleaning: Thoroughly clean metal surfaces of all mill scale, rust, dirt, grease, oil, moisture and other contaminants prior to galvanizing.

D. Application: Hot-dip galvanizing shall be applied in accordance with:

1. ASTM A 143: Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel.

2. ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

3. ASTM A 153: Galvanized Coating on Iron and Steel Hardware - Table 1.

4. ASTM A 385: Practice for Providing High Quality Zinc Coatings.

5. ASTM A 924: Galvanized Coating on Steel Sheets.

6. Minimum weight of galvanized coating shall be two (2) oz. per square foot of surface.

E. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

F. All galvanized materials must be inspected for compliance with these specifications and marked with a stamp indicating the name of the galvanizer, the weight of the coating, and the appropriate ASTM number.

G. To minimize surface imperfection (eg: flux inclusions), material to be galvanized shall be dipped into a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing. The type of galvanizing process utilizing a flux blanket overlaying the molten zinc will not be permitted.

H. After galvanizing all materials not exposed to view must be chromated by dipping material in a 0.2% chromic acid solution.

I. Galvanized surfaces, where exposed to view, must have a smooth, level surface finish. Where this does not occur, piece shall be rejected and replaced to the acceptance of the Commissioner.

2.4 PROTECTIVE COATINGS

A. Whenever dissimilar metals will be in contact, separate contact surfaces by coating each contact surface prior to assembly or installation with one coat of specified bituminous paint, which shall be in addition to the specified shop prime paint. Mask off those surfaces not required to receive protective coating.

2.5 WORKMANSHIP

A. General

1. Miscellaneous metal work shall be fabricated by an experienced fabricator or manufacturer and installed by an experienced tradesman.

2. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings and specifications, approved shop drawings, and best practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected.

3. All work shall be accurately and neatly fabricated, assembled and erected.

B. Shop Assembly: Insofar as practicable, fitting and assembly of work shall be done in shop. Shop assemble work in largest practical sizes to minimize field work. It is the responsibility of the miscellaneous metal subcontractor to assure himself that the shop-fabricated miscellaneous metal items will properly fit the field condition. In the event that shop-fabricated miscellaneous metal items do not fit the field condition, the item shall be returned to the shop for correction.

C. Cutting: Cut metal by sawing, shearing, or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp and free of burrs, without deforming adjacent surfaces or metals.

D. Holes: Drill or cleanly punch holes; do not burn.

E. Connections: Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to weather. Locate joints where least conspicuous. Unless indicated otherwise, weld or bolt shop connections; bolt or screw field connections. Provide expansion and contraction joints to allow for thermal movement of metal at locations and by methods approved by Commissioner.

1. Welding

   a. Shall be in accordance with "Standard Code for Welding in Building Construction" of the American Welding Society, and shall be done with electrodes and/or methods recommended by the manufacturer of the metals being welded.
   b. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces; undercut metal edges where welds are required to be flush.
   c. All welds on or behind surfaces which will be exposed to view shall be done so as to prevent distortion of finished surface. Remove weld spatter and welding oxides from all welded surfaces.

2. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads exposed to view shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts or adjacent metal.

F. Operating Mechanism: Operating devices (i.e. pivots, hinges, etc.) mechanism and hardware used in connection with this work shall be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.

G. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items specified under this Section of the Specifications to be built into concrete, masonry or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.

H. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.

I. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.

J. Exposed Work

1. In addition to requirements specified herein and shown on drawings, all surfaces exposed to view shall be clean and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs, and other defects which mar appearance of finished work.

2. Metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design.

3. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.

K. Preparation for Hot-Dip Galvanizing: Fabricator shall correctly prepare assemblies for galvanizing in consultation with galvanizer and in accordance with applicable Reference Standards and applicable AGA publications for the "Design of Products to be Hot-Dip galvanized After Fabrication." Preparation shall include but not be limited to the following:

1. Remove welding flux.

2. Drill appropriate vent holes and provide for drainage in inconspicuous locations of hollow sections and semi-enclosed elements. After galvanizing, plug vent holes with shaped lead and grind smooth.

2.6 MISCELLANEOUS METALS ITEMS

A. Rough Hardware

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and finish metal pieces panels (color anodized aluminum trim and panels), and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.

2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood connections; elsewhere, furnish steel washers.

B. Ladders

1. Vertical steel ladders shall be eighteen (18) inches wide with 3/4" diameter non-slip steel rungs spaced twelve (12) inches o.c. Stringers shall be 3/8" thick by 2-1/2" wide steel bars; rungs welded to bars. Attach ladders to walls six (6) inches from top and bottom and maximum thirty-six (36) inches o.c. from these points. At the roof, gooseneck the rails back to the structure to provide secure ladder access. Provide powder coat finish for roof ladders, as follows:

a. Powder-Coat Finish: Prepare, treat, and coat galvanized metal to comply with resin manufacturer's written instructions and as follows:
1). Prepare galvanized metal by thoroughly removing grease, dirt, oil, flux, and other foreign matter.

2). Treat prepared metal with zinc-phosphate pretreatment, rinse, and seal surfaces.
3). Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils.
4). Color: As selected by the Commissioner.

2. Ladders shall be fabricated to support a live load of one hundred (100) lbs. per square foot and a concentrated load of three hundred (300) lbs. per rung; loads not to act simultaneously.

C. Loose Steel Lintels

1. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than eight (8) inches bearing at each side of openings, unless otherwise indicated.

2. Loose lintels shall conform to the Schedule on the Structural Drawings.

3. At columns or vertical surfaces where lintels cannot bear on masonry, provide clip angles sized for structural capacity of lintel.

D. Miscellaneous Light Steel Framing

1. Light steel framing, bracing, supports, framing, clip angles, shelf angles, plates, etc., shall be of such shapes and sizes as indicated on the drawings and details or as required to suit the condition and shall be provided with all necessary supports and reinforcing such as hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly support and rigidly fasten and anchor same in place and to steel, concrete, masonry and all other connecting and adjoining work.

2. All light steel framing steel shall be furnished and erected in accordance with the applicable requirements of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction and as specified herein.

E. Steel Gratings and Frames

1. Provide hot dipped galvanized steel gratings complying with FS RR-G-661 with rectangular cross bars welded to bearing bars. Bars to have plain wearing surface.

2. Manufacturer: Provide gratings manufactured by Reliance, Borden, Irving Subway Grating, or approved equal.

3. Hinged Section: Provide hinged sections in areaway gratings where required by the drawings. Each hinged section up to 4'-0" wide shall be provided with two (2) five knuckle, fast pin, regular weight, plain bearing, wrought bronze butt hinges. Each hinged section over 4'-0" wide shall be provided with three (3) butt hinges. Hinged sections shall have provisions for padlocking on the underside.

4. Furnish grating frames, with corners mitered, welded and ground smooth, and with welded-on straps for secure anchorage into concrete. Frames and anchors to be galvanized.

5. Structural Performance: Provide gratings capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections:

   a. Floors: Capable of withstanding a uniform load of 250 lbf/sq. ft. or a concentrated load of 3000 lbf, whichever produces the greater stress.
   b. Walkways and Elevated Platforms Other Than Exits: Capable of withstanding a uniform load of 60 lbf/sq. ft. Limit deflection to L/360 or 1/4", whichever is less.
   c. Walkways and Elevated Platforms Used as Exits: Capable of withstanding a uniform of 100 lbf/sq. ft. or a concentrated load of 300 lbf on an area of 4 sq. in., whichever produces the greater stress. Limit deflection to L/360 or 1/4", whichever is less.
   d. Sidewalks and Vehicular Driveways: Capable of withstanding a uniform load of 250 lfb/sq. ft. or a concentrated load of 8000 lbf, whichever produces the greater stress.

F. Miscellaneous Steel Trim: Provide shapes and sizes for profiles shown. Except as otherwise indicated, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

G. Corner Guards: Provide steel corner guards where shown. Unless otherwise indicated, use 4" x 4" x 1/4" steel angles to a height of four (4) feet above finished floor with 1-1/4" x 8 1/4" bent steel strap anchors welded to backs of angles at each end and approximately sixteen (16) inches o.c. Set and adjust guards to finish flush with adjacent surfaces.

H. Countertop Supports: Steel framing as indicated or required to support countertops. Conceal framing under countertops and within wall behind countertops. Provide supports to withstand a concentrated load of not less than three hundred (300) lbs. applied at any point with a deflection not to exceed L/240 for the length of the countertop.

I. Aluminum Supports for Counters: Provide Rakks Counter Support Brackets, Center Supports EH1818 and EH1824 by Rangine Corporation; surface mounted; clear anodized coating complying with AAMA 607.1; or equivalent product of Federal Brace, Pickett, or approved equal. See Architectural Drawings for spacing.

J. Masonry Support Steel

1. Provide galvanized steel, relieving angles, plates, accessories and other steel shapes for masonry support steel; for lintels refer to Para. E. herein.

2. Fabricate masonry support steel to allow final adjustment with the closest tolerances possible. Relieving angles which require cutting to fit masonry flashing shall be straightened without deflections.

3. Coordinate masonry support system with concrete work for locations of wedge inserts.

4. Install to meet requirements of building masonry work, face brick coursing and stone placement. Coordinate final adjustments with masonry work as work progresses.

K. Sleeves in Concrete Walls and Slabs

1. Sleeves through concrete walls shall be of Schedule 40 steel pipe with i.d. two (2) inches larger than o.d. of pipe or conduit (including insulation, if any) to be accommodated. Sleeves shall project one-half (1/2) inch on each side of finished wall. Provide rectangular one-quarter (1/4) inch steel plate collar at center, continuously welded to the perimeter of the sleeve, and six (6) inches wider than the o.d.

2. Slots in slabs shall be 12 gauge steel sheet, galvanized, of dimensions indicated, with strap anchors welded in place not more than twelve (12) inches on centers.

L. Welded galvanized pipe railings.

1. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

   a. Steel: 72 percent of minimum yield strength.

2. Structural Performance: provide railing capable of withstanding the effects of gravity loads and the following loads and stresses within th elimits and under conditions indicated:

   a. Handrails

      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.

3. Thermal Movements: Provide exterior 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.

   a. Temperature Change(Range): 120 deg F ambient; 180 deg F, material surfaces.

4. Control of Corrosoion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

5. Project Conditions:

   a. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
      1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
      2. Provide allowance for trimming and fitting at site.

   b. so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.Coordinate installation of anchorages for railings. 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.
   c. Schedule installation so attachments are made only to completed walls or bases. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

6. Anchors: Provide cast-in-place anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

7. Fabrication

   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. Cut, drill and punch 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.
   c. Form work true to line and level with accurate angles and surfaces.
   d. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
   e. Welded Connections: cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

f. 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.

g. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with outside dimension to allow sleeving tight inside finish railing member.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where miscellaneous metal is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 ERECTION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.

C. Fitting Connections: Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.

D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance, and quality of welds made, and methods used in correcting welding work.

E. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

F. Field Touch-Up of Galvanized Surfaces: Touch-up shop applied galvanized coatings damaged during handling and installation. Use galvanizing repair coating specified herein for galvanized surfaces.

END OF SECTION

SECTION 062000

CARPENTRY

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; use of regional materials; use of certified wood; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the carpentry work as shown on the drawings and/or specified herein, including but not limited to, the following:

1. Blocking and miscellaneous wood.
2. Plywood wall lining for telephone and electric closets.
3. Plywood sheathing.
4. Rough hardware.
5. Installation only of finish hardware.
6. Installation only of doors and hollow metal frames.
7. Temporary protection furnished by Carpentry trades.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Roofing - Section 075200.

H. Steel doors and frames - Section 081113.

I. Finish hardware - Section 087100.

1.4 QUALITY ASSURANCE

A. Lumber Standard: Comply with PS 20.

B. Plywood Standard: Comply with PS 1 and American Plywood Assoc. (APA).

C. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.

D. Grade Marks: Identify lumber and plywood by official grade mark.

1. Lumber: Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.

a. S-Dry: Maximum nineteen (19) percent moisture content as per ASTM D 2016.

E. Installation of doors, frames and hardware shall conform to the minimum standards of "Installation Guides for Doors and Hardware" of the Door and Hardware Institute.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).

b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.

C. Fire-Retardant Treatment: Include certification by treating plant that treatment material complies with governing ordinances and that treatment will not bleed through finished surfaces.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in an area protected from the elements.

B. Deliver rough hardware in sealed kegs and/or other containers which shall bear labels as to type and kind.

C. Pile lumber for rough usage, when delivered to the site in stacks to insure drainage and with a minimum clearance of six (6) inches above grade. Cover stacks with tarpaulins or other watertight coverings. Store grounds and similar small sized lumber inside the building as soon as possible after delivery.

D. Do not store seasoned lumber in wet or damp portions of the building.

E. Protect fire retardant treated materials against high humidity and moisture during storage and erection.

F. Remove delivered materials which do not conform to specified grading rules or are otherwise not suitable for installation from the job site and replace with acceptable materials.

G. All items specified in Section 087100 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.

H. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.

1.8 JOB CONDITIONS

A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and the Commissioner.

B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 PRODUCTS

2.1 WOOD MATERIAL

A. General

1. All wood shall be sound, flat, straight, well seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.

2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of nineteen (19) percent. Wood shall be S4S, S-Dry, complying with PS-20.

3. Plywood and rough carpentry for telephone and electric closets, provide 3/4" thick C-D EXT-APA plywood, fire retardant treated as specified herein.

4. Plywood Sheathing: Provide APA Structural 1 Rated Sheathing, Exposure 1, with span rating to suit stud spacing; thickness as noted on drawings.

B. Wood Treatment

1. All interior wood material specified herein shall be fire retardant treated to comply with the AWPA standards (C20 for lumber, C27 for plywood) for pressure impregnation with fire retardant chemical to achieve a flame spread rating of not more than 25 (UL Class "FR-S") when tested in accordance with UL Test 723 or ASTM E 84. The fire retardant chemicals used to treat the lumber must comply with FR-1 of AWPA Standard P17 and be free of halogens, sulfates and ammonium phosphate.

   a. After treatment, kiln dry to a moisture content of fifteen (15) percent; if wood is to be painted or finished, kiln dry to a moisture content of twelve (12) percent. Treatment shall be equal to "Dricon" made by Arch Wood Protection Inc. or approved equal. Provide UL approved identification on treated materials.

2. For exterior blocking, roofing and sheet metal, pressure treat wood with copper azole, Type A (CBA-A); ammoniacal copper quat (ACQ) or similar preservative product that contains no arsenic or chromium. Preservative shall comply with AWPA Standard C-2 for lumber and C-9 for plywood, (.25 lbs./cubic foot of chemical in wood).

   a. After treatment, kiln dry to a maximum moisture content of fifteen (15) percent. Treatment shall be equal to "Wolmanized Natural Select" made by Arch Wood Protection Inc. or approved equal.

3. Treated wood which is cut or otherwise damaged shall be further treated in accordance with the AWPA Standard M-4.

2.2 HARDWARE

A. Rough Hardware for Treated Woods and Exterior Use: Hot-dipped galvanized or Type 304 stainless steel.

B. Nails: Common steel wire, untreated for interior work as per ASTM F 1667.

C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:

1. Bolts: ASTM A 307, Grade A.

2. Nuts: ASTM A 563.

3. Lag Screws and Bolts: ASME B 18.2.1.

D. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2; use stainless steel for treated woods and exterior use.

E. Wood Screws: ASME B 18.6.1.

F. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Commissioner.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where carpentry is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION OF FINISH HARDWARE

A. All finishing hardware specified in Section 087100 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.

B. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.

C. Hardware shall be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.

D. Unless otherwise noted, mount hardware units at heights established in Section 081113.

E. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.

F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

G. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

H. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.

I. All keys used shall be construction keys which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys shall be returned to the City of New York.

J. Adjusting and Cleaning

1. Adjust and check each operating item of hardware and each door, to ensure proper operation and function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.

2. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.3 INSTALLATION OF DOORS AND FRAMES

A. Preparation

1. Remove welded-in shipping spreaders installed at factory.

2. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

3. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

B. Installation

1. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. Install frames in accordance with ANSI 250.11-20001, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein.
b. At fire-protection-rated openings, install frames according to NFPA 80.
c. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
d. Install frames with removable glazing stops located on secure side of opening.
e. Frames set in masonry walls shall have door silencers installed in frames before grouting.
f. Remove temporary braces necessary for installation only after frames have been properly set and secured.
g. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.

a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.

4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames conforming to the requirements of Section 072100 – "Thermal Insulation."

5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar; refer to Section 042000 "Unit Masonry" for installation of frames in masonry walls.

6. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

7. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

8. In-Place Structural Steel Posts: Secure frames in place as detailed on the drawings and in accordance with manufacturer's written instructions.

9. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.

10. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

11. Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

    a. Non-Fire-Rated Standard Steel Doors:
        1). Jambs and Head: 1/8 inch plus or minus 1/16 inch.
        2). Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
        3). Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
        4). Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
    b. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

12. Glazing: Comply with installation requirements in Division 8 Section "Glass and Glazing" and with standard steel door and frame manufacturer's written instructions.

    a. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

C. Adjustments: Check and readjust operating finish hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and

replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

3.4 BLOCKING AND MISCELLANEOUS WOOD

A. General

1. Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.

2. Shim where required to true up furring, blocking and the like. Use wood or metal shims only.

3. Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.

B. Blocking and Miscellaneous Wood

1. Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc., that may be necessary and required in connection with the carpentry and with the work described for any other trades and including required carpentry for electrical fixtures. All blocking and nailers shall be continuous wherever required, whether or not so indicated.

2. Blocking shall be as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., shall be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.

3. Fastening for wood grounds, furring and blocking shall be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs, inserts or similar fastenings shall be used, of suitable type and size to draw the members into place and securely hold same.

C. Rough Lumber for Roofing and Sheet Metal

1. Furnish and install all wood nailing strips and wood blocking required in connection with respective types of roofing, fans, flashings, and sheet metal work, using preservative treated wood as herein before specified.

2. Wood blocking shall be of sizes and shapes as indicated on the drawings and/or designed for the reception of curb flashings for roof ventilators and similar items.

3. All nailing strips and blocking shall be carried out in accordance with the printed installation instructions, and/or recommendations of the accepted manufacturer of the roofing materials, and in coordination and cooperation with the sheet metal work trades.

4. All blocking and nailing strips shall be firmly secured in place using counter bored bolt and nut fastenings, or secured by any other proposed flush surfaced fastenings.

5. Wood nailing strips or blocking required to be embedded in concrete work shall be furnished in time due for placing, prior to start of concrete operations. Locations and spacings of nailing strips or blocking shall be performed in coordination with the concrete trades, as required for respective installations.

3.5 TELEPHONE AND ELECTRIC EQUIPMENT MOUNTING BOARDS

A. Furnish and install 3/4" thick plywood panels to the walls of the telephone and electric equipment rooms in accordance with the requirements of the local utility company.

B. Secure to wall using proper devices for substrates encountered, spaced twelve (12) inches o.c., maximum around the edges, 1-1/2" from corners, and in three (3) rows of three (3) each in the field. Recess fastening devices flush with the plywood surface. Adjacent panels shall be butted with 1/16" space between without lapping.

3.6 PLYWOOD SHEATHING

A. Install plywood sheathing horizontally or vertically using panels continuous over 2 or more spans. Nail edges and ends over supports at 6" o.c. and at 12" o.c. over intermediate studs using 6d nails for panels not more than 1/2" thick and 8d nails for thicker panels. Allow 1/8" spacing at panel ends and 1/4" at panel edges.

3.7 ROUGH HARDWARE

A. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and the Contract Documents.

B. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.

C. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than sixteen (16) inches apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than sixteen (16) inches apart.

D. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surfaces and peen as may be required to receive finished work.

E. Inserts to secure wood nailers to concrete shall be malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding thirty (30) inches o.c.

F. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing

blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.

G. Detailed instructions with sketches of necessary requirements, shall be given to the masonry trade showing the location and other details of such nailing devices.

3.8 TEMPORARY PROTECTION BY CARPENTER

A. General: Provide temporary protection as follows:

1. Temporary wood doors at exterior entrances, as required.

2. Temporary protection and enclosures at exterior entrances.

3. Temporary sills at door thresholds and other openings.

B. Exterior Openings: Provide temporary enclosures for exterior openings where required, properly secured and maintained until finished work is in place. Provide a sufficient number of temporary doors to give access to the building, all provided with hardware, locks and keys.

C. Maintenance: Maintain all temporary protection in good repair during the construction period. Remove when no longer required.

D. Temporary Locks: Provide temporary locks, including keys, for temporary doors. Use of permanent building hardware in connection with temporary doors is prohibited.

3.9 CLEANING UP

A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.

B. Sweeping: At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.

1. Remove the refuse to the area of the job site set aside for its storage.

2. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION

SECTION 062023

CABINETRY AND MILLWORK

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; use of regional materials; use of certified wood; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the cabinetry and millwork as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Wood casework with birch veneer finish.

2. Wood countertops for cabinet work.

3. Solid composite panels for Reception desk.

4. Cabinet hardware.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Carpentry - Section 062000.

1.4 QUALITY ASSURANCE

A. Qualifications of Fabricators and Installers: For actual fabrication and installation of cabinetry and millwork, use only personnel who are thoroughly trained and experienced in the products involved and in the recommended methods for their fabrication and installation.

B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with "Quality Standards" of the Architectural Woodwork Institute (AWI) for the grades specified.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an

MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Shop Drawings: Before any cabinetry and millwork are fabricated and delivered to the job site, submit complete Shop Drawings to the Commissioner for approval.

C. Quality Certification: Submit fabricator's certification stating that the fabricated work meets the woodwork grade specified and that the wood used is fire retardant treated in accordance with these specifications.

D. Samples: Submit samples of all proposed materials to the Commissioner for the selection of actual colors and patterns.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect architectural woodwork before, during, and after installation, and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Commissioner and at no additional cost to the City of New York.

C. Delivery: Do not deliver woodwork until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.8 JOB CONDITIONS

A. Examination: The installer must examine the substrates and conditions under which the work is to be installed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer and the Commissioner.

B. Conditioning: Do not install woodwork until the required temperature and relative humidity have been stabilized and will be maintained in installation areas.

PART 2 PRODUCTS

2.1 CABINETRY AND MILLWORK

A. General

1. Fabricate all cabinetry and millwork to the "Premium" grade standards of the AWI, Section 400.

2. Wood core to receive veneer finish shall be fire retardant treated in accordance with the requirements of Section 062000. Inner plies for birch veneer casework are solid birch

3. Face construction of cabinets shall be "Inset."

4. Provide 3/4" thick slab doors, drawer fronts and fixed panels (including thickness of veneer) except where required to be thicker by Standards; and provide flush units.

5. Provide dust panels of 1/4" thick plywood or tempered hardboard above compartment and drawers, except where located directly below countertops.

6. Exposed Edges: Exposed edge of birch veneer panel, sanded and sealed, clear satin. Ease exposed edge of overlap sheet.

B. Veneer: Smooth birch face veneers with phenolic resin thermally fused into both panel sides. Basis of dsign is North American Plywood Corp. "Finland Form/ Euro Form," or equivalent of McCausey Lumber Co., Thomas Canada, or approved equal.

1. Color: As scheduled.

2.2 SOLID COMPOSITE PANELS

A. Provide 1/2" thick solid composite, chemically-resistant countertop material. Basis of design product to be "Athlon" manufactured by Trespa North America Ltd. or equivalent product of Prodema: Proligna in the ProdIn Interior Products Group, or approved equal. Panels shall have exposed edges and exposed countersunk fasteners.

1. Color: As scheduled.

B. Counters shall be adhesively joined with no exposed seams, having edge details shown on drawings.

C. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints.

D. Sealant: Manufacturer's standard mildew-resistant silicone sealant in colors matching components.

2.3 GLASS

A. Glass used at Reception Desk construction shall be tempered, complying with the requirements of Section 088000.

2.4 COUNTERTOPS

A. Grade: Same as AWI grade required for cabinetwork; birch veneer finish.

B. Construction

1. Exposed Counter Edges: Exposed edge of birch veneer panel, sanded and sealed, clear satin, except as otherwise indicated. Ease exposed edges of overlap sheet.

2. Cut openings for equipment to be installed. Comply with equipment manufacturer's requirements, but provide internal corners of 1/8" minimum radius. Smooth saw cut and ease edges.

3. Seal cut edges of counter at openings for sinks and other "wet" equipment, using waterproofing compound recommended by veneer panel manufacturer and compatible with laminating adhesive.

2.5 CABINET HARDWARE

A. General: Provide complete cabinet hardware and accessory material associated with cabinetry and millwork and as required for installation and operation of cabinets. Hardware design shall be as selected by the Commissioner.

B. Hardware Standards: Comply with ANSI A156.9 "American National Standard for Cabinet Hardware." Quality Level: Type 2 (Institutional).

C. Cabinet Door Hardware: Continuous piano hinges, satin stainless steel; Monroe PMP, Marlboro Hinge, S+S Hinge, or Commissioner-approved equal.

D. Drawer Hardware: Provide slides and pulls to properly accommodate each drawer size and style. Equip each drawer with side mounted, full extension, ball bearing, nylon roller drawer slides.

E. Locks: Provide standard pin-type or disc-type (5 pins or discs) tumbler locks, keyed individually except as otherwise indicated.

F. Shelf Supports: Where shelving is indicated as "adjustable," provide slotted type needed to properly support the shelves with uniform forty (40) lbs. per square foot loading.

G. Shelf Supports in Cabinets: Metal Spoon Supports, stainless steel.

H. Exposed Hardware Finish: Provide exposed hardware with BHMA Code satin stainless steel finish (US32D).

I. Cabinet Pulls: Sugatsune, Doug Mockett, EPCO, or Commissioner-approved equal.

J. Glass Doors and Shelves: Clear plate or sheet glass; FS DD-G-451, Type I, 1/4" thick; which has been seamed at exposed edges, and tempered to 4 x normal flexural strength.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where cabinetry and millwork are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 FABRICATION

A. Fabricate all architectural woodwork in strict accordance with the approved Shop Drawings and the referenced standards.

3.3 INSTALLATION

A. Install cabinetry and millwork in accordance with Section 1700 of AWI standards.

B. Install the work plumb, level, true and straight, with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offsets in revealed adjoining surfaces.

C. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

E. Casework: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust casework and hardware so that doors and drawers operate smoothly and with tolerances as established by standards. Lubricate operating hardware as recommended by manufacturer.

F. Countertops: Anchor securely to base units and other support systems.

3.4 PROTECTION

A. Cover casework with four (4) mils polyethylene film, for protection against soiling and deterioration during remainder of construction period.

END OF SECTION

SECTION 071326

SHEET MEMBRANE WATERPROOFING

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the sheet membrane waterproofing as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Sheet membrane waterproofing, for foundation wall surfaces.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete - Section 033000.

H. Earthwork - Section 312000.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Shop Drawings: Typical installation details, showing details at flashings, at terminations, at joints, at intersection of horizontal and vertical surfaces, and at penetrations in membrane system.

C. Samples - Submit

1. Membrane, 6" x 6" samples of each membrane.

2. 6" x 6" sample of flashing.

3. 6" x 6" sample of drainage board.

D. Manufacturer's literature: Submit manufacturer's technical, safety data sheets, and installation literature for all materials of this Section. Submit Independent Test data indicating that membrane meets properties specified herein.

E. General Contractor's Certification: Submit per Article 1.7.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 STORAGE OF MATERIALS

A. All materials shall be stored in their original tightly sealed containers or unopened packages; shall be clearly labeled with the manufacturer's name, brand name and number, and batch number of the material with expiration date where appropriate.

B. Materials shall be stored in a neat and safe manner so as not to exceed the allowable live load of the storage area.

C. Material shall be stored out of the weather in a clean, dry area.

D. Liquid materials, such as adhesives, thinners and primers, shall be stored in areas away from sparks, open flames and excessive heat.

1.7 JOB CONDITIONS

A. No application of liquid applied urethane flashing shall commence or proceed during inclement weather, or the threat of imminent precipitation.

B. All surfaces to receive the system shall be thoroughly dry and free of dew or frost.

C. Application temperatures are not limited except that materials shall be stored until time of mixing at temperatures above 60 deg. F. to maintain a consistency suitable for mixing. Do no work below 40 deg. F.

D. Prior to and during application, all dirt and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air, or similar methods.

E. Surfaces not designated to receive the system shall be properly masked or otherwise protected against accidental spillage or application of the material to those areas.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period. Warranty period shall be three years from date of Substantial Completion.

B. Installer's Special Warranty: Specified for, signed by Installer, covering work of this Section, for warranty period of two years from date of Substantial Completion. Warranty includes repair and/or replacement, at no additional cost to the City of New York, of all other work which may be damaged as a result of such defective work, and which becomes defective during the warranty period.

1.9 QUALITY ASSURANCE

A. Preinstallation Conference: Approximately 2 weeks prior to scheduled commencement of waterproofing installation, meet at Project site with Waterproofing Installer; preparer of substrate to receive waterproofing; installers of other work in and around waterproofing that must precede, follow, or penetrate waterproofing (including Mechanical and Electrical Installers as applicable); Commissioner; City of New York; and waterproofing manufacturer's representative to review materials, procedures, schedules, and other requirements and conditions related to installing waterproofing.

B. Manufacturer: The manufacturer providing the material or equipment specified in this Section must, for the past three years, have been regularly engaged in the manufacture of material or equipment similar in type to that required for this Project. Such similar material or equipment provided by the manufacturer must have been in satisfactory service for not less than three years.

C. Installer: The contractor or subcontractor performing the work of this Section must, within the last three consecutive years prior to the bid opening, have successfully completed in a timely fashion projects similar in scope and type to the required work.

1.10 PROTECTION

A. Against Loads: Protect work of this Section against concentrated loads and any other loads or equipment that would damage the materials or work.

B. Against Traffic: Do not permit traffic on horizontally installed work of this Section, except for workmen doing the work, during the installation, and after the installation until membrane systems are covered with protective boards or with the specified finishing materials.

C. Against Damage: Protect vertically installed work of this section from damage by reinforcing and placement.

1. Take and maintain necessary preventative measures to protect work of this Section from damage until Project is accepted.

2. Rejection of Damaged Work

   a. Damaged materials or work will be rejected.
   b. Rejected materials or work must be immediately removed and replaced with new materials.

1.11 FIELD QUALITY CONTROL

A. Construction Traffic:

1. Limit construction traffic over completed membrane.

2. General Contractor shall provide 1/2 inch plywood protection layer, where construction traffic is unavoidable.

B. Inform Commissioner in writing on a daily basis of any of the following events. State specific location of each occurrence.

1. Buckling to the Waterproofing and other deformations as a result of ground water events.

2. Leakage through the finished waterproofing installation.

3. Damage by other trades.

C. Provide Manufacturer's Representative's report (prior to backfill) stating that the waterproofing has been inspected and is acceptable.

PART 2 PRODUCTS

2.1 WATERPROOFING MEMBRANE

A. Manufacturers: Subject to compliance with requirements, provide products manufactured by one of the following, or approved equal:

1. W. R. Grace Co.

2. Carlisle.

3. Polyguard Products, Inc.

B. Basis for Project Design: Product names, numbers and other designations are those of W.R. Grace, used to set a design standard only.

C. For foundation walls, provide "Bituthene 4000" sheet waterproofing membrane, 60 mils thick, and "Bituthene Liquid Membrane," 60 mils thick, for flashing, as manufactured by W. R. Grace or equal by Carlisle, Polyguard Products, Inc., or approved equal.

D. Bituthene Surface Conditioner: Latex/water based primer specifically formulated to provide adhesion of Bituthene Waterproofing Membranes.

E. Bituthene Elastomeric Mastic: Rubberized asphalt base mastic.

F. Bitustik Tape: Double sided synthetic adhesive tape.

G. Protection Board: 1/4" thick semi-rigid protection board, Bituthene Asphaltic Hardboard.

H. Bituthene Liquid Membrane: Two-component 100% solids trowel grade asphalt modified urethane.

I. Hydroduct 220 Drainage Board/Composite: Prefabricated dimpled polystyrene drainage core with a non-woven filter fabric on one side and a polymer film on the reverse side.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where membrane waterproofing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 PREPARATION OF SURFACES TO RECEIVE WATERPROOFING

A. Conform to the requirements of Bituthene Techletter No. BTL 82-02, published by W. R. Grace.

3.3 INSTALLATION

A. General: Conform to recommendations and published specifications of the manufacturer' including environmental requirements.

B. Foundation Walls (Accessible Walls)

1. General: The membrane, when in place must withstand a minimum static ground water pressure of 150 feet.

2. Priming: Application of primer shall be limited to what can be covered with Bituthene Waterproofing Membrane in a given work day. Primed areas not covered by membrane during the work day will be reprimed. Apply primer by spray, roller or brush at a rate of 250 - 350 sq. ft. per gallon. Roller shall be natural material such as lamb's wool, having a nap of approximately one inch. Primer shall be applied to a clean, dry, frost-free and dust-free surface. Sufficient primer must be used on the day surface to condition it to a dust-free state suitable for the application of Bituthene Waterproofing Membranes.

a. Bituthene Surface Conditioner should not be applied below 40 deg. F. on vertical surfaces. Allow primer to dry 30 minutes.

3. Membrane Installation: Apply Bituthene Waterproofing Membrane vertically in sections of 8' in length or less. On higher walls apply two or more sections with the upper overlapping the lower by a least 2-1/2". Press all membrane in place with heavy hand pressure or rollers during application.

4. Sealing Edges: Bituthene Waterproofing Membrane shall be applied over the edge of the slab or over the top of the foundation or parapet wall. If the membranes are terminated on the vertical surface, a reglet or counter flashing may be used or the membrane may be terminated directly on the vertical surface by pressing very firmly to the wall. Press edges with a metal or hardwood tool such as a hammer or knife handle. Apply a troweled bead of Bituthene Mastic to all vertical and horizontal terminations. Bituthene Liquid Membrane can be used as an alternative method at the General Contractor's option.

5. Sealing Seams: All edges and end seams must be overlapped at least 2-1/2". Apply succeeding sheets with a minimum 2-1/2" overlap and stagger end laps. Roll or press the entire membrane firmly and completely as soon as possible. Patch misaligned or inadequately lapped seams with Bituthene Membrane. Slit any fish mouths, overlap the flaps, and repair with a patch of Bituthene and press or roll in place. The edges of the patch shall be sealed with a troweling of mastic. Laps within 12" of all corners shall be sealed with a troweling of mastic.

6. Corner Forming: Outside corners must be free of sharp edges. Inside corners shall receive a fillet formed with Liquid Membrane, latex modified cement mortar equal to Daraweld C made by Grace mixed with cement mortar or epoxy mortar. Do not use fiber or wood cants. One of two methods may be used for treating corners at the General Contractor's option:

   a. Apply Bituthene Liquid Membrane 6" in each direction from the corner and form a fillet with a minimum 3/4" face.
   b. Install an 11" minimum strip of Bituthene Membrane centered on the corner. Install Bituthene Membrane over the treated inside and outside corners.

7. Over waterproofing, apply drainage composite board by adhering board to cured membrane using tape or adhesive per manufacturer's recommendations.

3.4 CLEAN-UP

A. Upon completion of the waterproofing system, the General Contractor shall remove all equipment, material and debris from the work and storage area, and leave those areas in an undamaged and acceptable condition.

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SECTION 072100

THERMAL INSULATION

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the thermal insulation as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Insulation under slabs-on-grade.
2. Exterior face of CMU cavity wall back-up insulation.
3. Cavity wall insulation within masonry cavity.
4. Miscellaneous blanket insulation.
5. Attachment devices.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Masonry - Section 042000.

H. Roof insulation - Section 075200.

I. Firestops and smokeseals - Section 078413.

J. Acoustical insulation - Section 092900.

K. Earthwork - Section 312000.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets,

manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Submit product data for each type of product indicated, including re-cycled content.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 QUALITY ASSURANCE

A. Fiberglass insulation shall contain a minimum of 20% (by weight) recycled content, calculated by adding the post-consumer recycled content percentage to one-half of the post-industrial recycled content percentage.

B. Mineral wool insulation shall contain a minimum of 75% (by weight) recycled content, calculated by adding the post-consumer recycled content percentage to one-half of the post-industrial recycled content percentage.

C. Extruded polystyrene insulation shall contain a minimum of 5% (by weight) recycled content, calculated by adding the post-consumer recycled content percentage to one-half of the post-industrial recycled content percentage.

D. To the greatest extend possible, the Contractor shall use extruded polystyrene insulation products that do not utilize chlorine based gases in the production process.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type and brand. Delivered materials shall be identical to approved samples.

B. Store materials under cover in a dry and clean location, off the ground. Remove materials which are damaged or otherwise not suitable for installation and replace with acceptable materials.

C. Take every precaution to prevent the insulation from becoming wet, cover with tarps or other weather/watertight sheet goods.

PART 2 PRODUCTS

2.1 UNDERSLAB INSULATION

A. Provide extruded polystyrene board insulation equal to "Styrofoam Brand Square Edge" manufactured by Dow Chemical Co., or approved equal made by Owens Corning or PACTIV Building Products, conforming to ASTM C 578, Type IV, with a maximum flame spread and smoke developed indices of 75 and 450 respectively, and minimum compressive strength of 25 psi.

B. Insulation shall have an aged R value of not less than 5/inch; shall be 3" thick unless otherwise noted on the drawings.

2.2 CAVITY WALL INSULATION WITHIN MASONRY CAVITY

A. Provide extruded polystyrene board insulation equal to Styrofoam "Cavitymate Ultra" by Dow Chemical Co. or equivalent product of Owens Corning, Pactiv Building Products, or approved equal conforming to ASTM C 578, Type IV with a maximum flame spread and smoke developed indices of 15 and 165 respectively.

1. Boards shall be 16" wide x 96" long; boards shall be 1" thick unless otherwise noted on the drawings.

2. Insulation shall have an aged R value of not less than 5.6/inch.

2.3 OTHER RIGID INSULATION

A. Slab-on-Grade Perimeter Insulation: Provide extruded polystyrene board, high-compressive-strength insulation equal to "Styrofoam Highload 60" manufactured by Dow Chemical Co., or equivalent product made by Owens Corning, PACTIV Building Products, or approved equal, conforming to ASTM C 578, Type VII, with a maximum flame spread and smoke developed indices of 15 and 165 respectively.

1. Insulation shall have an aged R value of not less than 5.0/inch; shall be 3" thick unless otherwise noted on the drawings

B. Rigid Insulation For CMU Back-UpWall – Exterior Face of Perimeter Wall: Provide foil-faced, polyisocyanurate board insulation equal to "Thermax Sheathing,"

manufactured by Dow Chemical Co. or approved equal conforming to ASTM C 1289, Type I, Class 2, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, based on tests performed on unfaced core on thicknesses up to 4 inches, and minimum compressive strength of 25 psi.

1. Boards shall be nominal 1.0" thick unless otherwise noted on the drawings.

2. Insulation shall have an aged R value of not less than 6.5/inch.

2.4 BLANKET INSULATION

A. Provide flexible glass fiber blankets/batts equal to "Fiberglass Flame Spread 25 Insulation" by Owens Corning or equal by Manville, Certainteed or approved equal conforming to ASTM C 612, Type 1A or ASTM C 665, Type III, Class A, faced on one side with foil reinforced Kraft vapor retarder; maximum flame spread and smoke developed indices 25 and 50 respectively.

B. Insulation shall have an R value of not less than 3.7/inch and shall be 3" thick unless otherwise noted on the drawings.

2.5 ACCESSORIES

A. Clips for Securing Insulation to Encountered Surfaces: Spindle anchor and washer type consisting of perforated metal plates with spindle welded to center and snap on washers. Spindle and washers shall receive a corrosion-resistant electro-zinc plating. Adhesives for securing clips in place shall be recommended by the approved clip manufacturer.

1. Acceptable Manufacturers

a. Miracle Adhesives Corp.
b. Stic-Klip Mfg. Co., Inc.
c. Midwest Fasteners
d. or approved equal

B. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer, and complying with fire-resistance requirements.

1. For bonding rigid polystyrene insulation to masonry or concrete, provide adhesive equal to "Foamgrab PS" by Dacor Products Co. or equal made by ChemRex Inc., Miracle Adhesives, or approved equal.

C. Protection Board: Premolded, semi-rigid asphalt/fiber composition board, 1/4" thick, formed under heat and pressure, standard sizes.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where thermal insulation is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. General

1. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

2. Install insulation in as large components as practical and to cover entire areas indicated on the drawings, closely butted together at sides and ends, and against walls, beams, etc. Neatly fit and cut insulation around all projections such as pipes, conduits, hangers and all other elements encountered in the field, which will result in complete coverage of the scheduled areas.

3. Discard, off the site, insulation which becomes damaged during the course of installation, or is no longer in a physical condition to function for use intended, and replace with new material.

4. Clean surfaces on which adhesives are used to secure the insulation in place of dirt, grime, grease, oil and other foreign materials, to assure that the surfaces are properly prepared to accept the bond of the approved adhesives.

5. Exercise extreme care to avoid damage and soiling of faces on insulation units which will be exposed to view. Align joints accurately, with adjoining surfaces set flush.

6. Set vapor barrier faced units with vapor barrier to inside of construction, except as otherwise shown. Do not obstruct ventilation spaces. All joints in vapor barriers shall be sealed with 4" wide, foil faced duct tape to prevent vapor and air migration.

7. Tape joints and ruptures in vapor barriers, using tape specified above, and seal each continuous area of insulation to surrounding construction so as to ensure vapor tight installation of the units.

8. Where insulation is impaled on stick clips, provide clips not less than 3" from corners or edges and not more than 12" o.c.

9. Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.

10. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

11. Apply a single layer of insulation to the required thickness, unless a double layer is required, to make up the total thickness shown.

12. Furnish mason trades rigid insulation to be installed within masonry cavity.

3.3 INSTALLATION OF UNDERSLAB INSULATION

A. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

B. Protect top surface of horizontal insulation (from damage during concrete work) by application of protection board.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

A. Install small pads of adhesive spaced approximately 1'-0" o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction.

3.5 INSTALLATION OF BLANKET OR BATT FIBERGLASS INSULATION

A. Install blanket fiberglass insulation in largest pieces as practical with edges closely butted. Cut and fit insulation to closely fit intersecting or penetrating surfaces.

1. Face vapor barrier towards warm side, tape joints with 4" wide vaporproof aluminum tape applied over vapor barrier.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

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SECTION 072616

BELOW-SLAB VAPOR RETARDER

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the below-slab vapor retarder as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Confirm that the substrates for the below-slab vapor retarder are acceptable.

2. Provide a below-slab vapor retarder below slab.

3. Integrate the vapor retarder with all surrounding work; coordinate all work with related trades.

4. Provide all necessary permits and fees for this work, including building permits, inspection fees, police detail, etc.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Cast in place concrete - Section 033000.

H. Review specifications for related work for purposes of coordination.

I. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so that the intent of the Drawings and Specifications is carried out.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for

review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Submit the following items in time to allow for review by the Commissioner and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Commissioner's written approval.

1. Shop drawings of all conditions and details, including connection to all surrounding work and isometric details of complex conditions. Include work sequence for conditions between work of this Section and surrounding work; coordinate with related trades.

2. Contractor's qualifications.

3. Samples and/or manufacturer's literature for all materials specified or proposed for use on the project, properly labeled and referenced to the appropriate specification section. Samples required include, but are not limited to, the following:

   a. Vapor retarder.
   b. Seam tape.
   c. Protection layer.
   d. Any product or material proposed for substitution.

4. Certifications (in time for review to prevent delay in the work) by the producers of all materials stating that the materials supplied comply with all the requirements of the referenced standards and that all materials are suitable for the use specified herein.

5. Material Safety Data Sheets (MSDS) for each material where appropriate.

6. Project Schedule and Sequencing. Submit updated project schedule weekly throughout the project to reflect current status and project schedule.

7. Vapor retarder manufacturer's sample guarantees.

1.5 QUALITY ASSURANCE

A. Conduct a quality control program that includes the following as a minimum:

1. Inspect conditions and materials to ensure conformity to the contract requirements.

2. Continuously inspect substrate conditions and coordinate with the Commissioner to ensure proper substrate preparation in conformance with the contract requirements.

3. The Contractor shall arrange with the vapor retarder manufacturer to have a competent field representative visit the site to inspect the workmanship and the quality of the work. The manufacturer should visit the site as required to observe the progress of the work, but at least three times during the course of the project. The field representatives shall issue written reports of their findings and recommendations for corrective work, if any, to the Commissioner. The Contractor shall include all costs for the field representative, including all expenses, in the project bid price.

a. The representative shall review and approve the condition of substrates prior to application of vapor retarder.
b. The representative shall observe the first one to two days of application of vapor retarder.
c. Representative shall review and approve below-slab-vapor-retarder conditions prior to pouring concrete.

4. Inspect work in progress and during inclement weather to ensure that the work is in compliance with approved procedures.

5. Inspect all completed and any corrected work for compliance with the Contract Documents and the vapor retarder manufacturers' recommendations.

B. The vapor retarder system shall be applied by an approved contractor authorized by the vapor retarder manufacturer to perform the work.

C. The Contractor/Subcontractor and its site superintendent(s) and Foreman shall have at least three years' successful experience with similar vapor retarder and flashing work.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. The Contractor is responsible for protecting all materials and equipment stored on the site.

B. All materials to be new. Handle all materials to prevent damage. Place materials on pallets. Use waterproof and fireproof canvas tarpaulins (not polyethylene) to cover all stored materials top to bottom.

C. Deliver materials clearly marked with legible and intact labels with manufacturer's name and brand name, and identifying contents of containers.

D. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life.

E. Protect all materials in original unopened labeled containers and packaging and in compliance with manufacturer's directions. Comply with manufacturer's recommendations for minimum and maximum time and temperature limits for storage. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

F. Promptly remove from the site all materials rejected by the Commissioner or exposed to any moisture anywhere, at any time, during transportation, storage, handling, and installation.

G. Do not stockpile materials or equipment to overload any building or site component.

H. Protect materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed when not in use and away from open flames. Protect liquid components from freezing.

I. Store rolled goods on ends only. Discard rolls that have been flattened, creased, or otherwise damaged. Unroll sheets and allow them to "relax" prior to use.

J. Do not dilute primers, waterproofing cements, adhesives, coatings, or sealants. Keep containers closed, except when removing materials. Do not use equipment that is contaminated with materials that may be incompatible with the work.

K. Dispose of debris as required by state and local ordinances. All debris shall be removed from the site and the site returned to its original condition upon completion of the project.

L. Do not allow wrappers, packaging materials, or any other debris to be included in the vapor retarder system.

1.8 PROJECT CONDITIONS

A. Coordinate the work, use of the site, storage areas, and staging areas with the Contractor. Limit use of the site and working hours to dates, times, and locations approved by the Contractor.

B. All equipment used on the project shall comply with all applicable municipal and safety regulations – including OSHA guidelines – and be suitable for reasonable access for inspection of the City of New York's representative, who shall have free access to the work via the Contractor's equipment.

C. Compliance with OSHA and all other safety laws and regulations is the exclusive responsibility of the Contractor, his Subcontractors, suppliers, consultants, and employees.

1.9 WARRANTY/GUARANTEE

A. Guarantee all work under this Section in a document stating that if, within two years after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Contractor shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the City of New York to do so, unless the City of New York has previously given the Contractor a written acceptance of such condition.

PART 2 PRODUCTS

2.1 GENERAL

A. Check the availability of all specified items early and report any long lead times that may impact the intended schedule to the City of New York promptly to prevent delays in the work.

B. All materials are to be new. Handle, store, and install materials as recommended by the manufacturer. Materials shall be delivered to the job site in their original containers with the manufacturer's name, grade, number, and batch identification on the container or packaging.

2.2 MATERIALS

A. Unless approved by the Commissioner, obtain all vapor retarder materials from the same manufacturer. All components of the vapor retarder system shall be as manufactured by, or approved by, the vapor retarder manufacturer and will be included in the vapor retarder system manufacturer's warranty.

B. Vapor Retarder

1. Basis of Design: Stego Wrap 15 mil Vapor Retarder.

2. Acceptable Alternative Products: Moistop 15 by Fortifiber Building Systems, Griffolyn Vaporguard by Reef Industries, or approved equal.

2.3 ACCESSORIES

A. Seams :

1. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

B. Penetrations of Vapor barrier:

1. Stego Mastic by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

2. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

C. Perimeter/edge seal:

1. Stego Crete Claw by Stego Industries LLC, (887) 464-7834 www.stegoindustries.com.

2. Stego Term Bar by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

3. StegoTack Double-Sided Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

PART 3 EXECUTION

3.1 GENERAL WORKMANSHIP

A. Vapor retarder systems shall be installed by contractors specifically authorized by the appropriate manufacturer. Perform all work with trained personnel.

B. Arrange work sequence to avoid use of newly constructed vapor retarder for storage, walking surface, and equipment movement. Where access is absolutely required, protect surfaces with smooth 1/2 in. thick plywood runways to ensure full protection of vapor retarder surfaces and all other work against mechanical damage. Provide additional protection if needed to prevent damage. Move equipment and ground storage areas as work progresses to avoid abuse of completed vapor retarder.

C. Replace any new materials scheduled to remain that are damaged due to weather or other causes during the period of the work at no additional cost to the City of New York. If water causes damage, remove and replace all wet materials at no additional cost to the City of New York.

D. Do not work in temperatures below 40 deg F. Comply with applicable recommendations by manufacturers of all materials and workmanship and handling, except as modified in this Section.

E. Promptly remove from the site all damaged, defective, or rejected materials. Remove from the site all materials rejected by the City of New York or Commissioner.

F. Components of the vapor retarder system may be toxic and flammable. Heed all manufacturer's cautions and warnings concerning their use. Completed vapor retarder is slippery when wet or frost-covered. Take proper precautions.

G. Do not use equipment for vapor retarder installation that is contaminated with materials that may be incompatible.

H. Workers and all others that walk on the waterproofing membrane shall wear clean soft-soled shoes so as not to damage vapor retarder and related materials.

3.2 REPAIR AND PREPARATION OF SURFACES TO RECEIVE VAPOR RETARDER

A. General

1. Examine all surfaces scheduled to receive vapor retarder for roughness, contaminants, unsound structural substrates, or other conditions that may impair the vapor retarder application. Notify the Commissioner in writing of any such conditions; do not commence work until all defects are remedied.

2. Clean the all substrates of all foreign substances and remove loose materials, grease, oil, and other contaminants. The vapor retarder contractor and manufacturer shall inspect and approve the substrates before application of the vapor retarder system.

B. For horizontal surfaces to receive vapor retarder, the earth and crushed stone substrates shall be compacted to produce an even, sound substrate. Loose aggregate, sharp protrusions, and standing water shall be removed.

3.3 VAPOR RETARDER INSTALLATION

A. General

1. Conform to recommendations and published specifications of the manufacturer, including environmental requirements.

2. Do not allow water to pond on vapor retarder. Promptly remove water that collects on vapor retarder with vacuum or other method acceptable to Commissioner.

B. Installation of Below-Slab Vapor Retarder

1. Vapor Retarder Installation: Below-slab vapor retarder shall be applied horizontally over the substrate. Minimize joints between sheets of vapor retarder to the greatest extent practical, without inhibiting the work. Overlap ends of sheets a minimum of 6 in. Overlap subsequent sheets 6 in. The below-slab vapor retarder sheets shall extend minimum 24 in. (or more if required on Drawings) past the future edge of the slab to allow for effective joining of the below-slab vapor retarder with foundation waterproofing.

2. Cleaning Edges and Seams: All lap/seam areas shall be fully cleaned prior to taping. If contaminated by dust, debris, water, or other contaminants, fully clean the seam with the cleaner recommended by the manufacturer and allow the seam area to fully dry before completing the seam.

3. Sealing Seams and Edges: Install seam tape within all seams. Provide a continuous unbroken seal. Roll seams with a rubber roller with moderate pressure; achieve continuous adhesion.

4. Sealing Penetrations: Penetrations shall be flashed with prefabricated pipe boots to the greatest extent practicable. Other penetrations shall be fully wrapped with vapor retarder material. Seal all seams and edges with seam tape. Provide stainless steel hose clamps at round penetrations.

5. T-Joints: Take extra care at T-joints to ensure that pinhole tunnels are not created. Install an additional patch of seam tape if needed.

6. Inside Corner Forming: Vapor retarder at inside corners shall be folded and creased (not cut) to the greatest extent practicable. The folded flap shall be taped in place with seam tape.

7. Joining and Sealing Below-Slab Vapor Retarder with Foundation Wall Waterproofing: Follow Drawings and manufacturer's installation instructions and ensure that all joints are fully and continuously sealed.

   a. After concrete is poured, secure and seal top of below-slab vapor retarder to foundation with two rows of seam tape and termination bar (fastened 8 in. o.c.) installed 2 in. below the top edge; seal the top edge. Foundation wall waterproofing shall shingle over vapor retarder a minimum of 12 in.; seal edge.

3.4 VAPOR RETARDER INSPECTION AND REPAIR

A. Inspection and repair of the below-slab vapor retarder system shall occur before installation of the reinforcement steel, before installation of formwork, and prior to placement of the concrete. Punctures shall be repaired as follows:

1. Clean surface with damp cloth, or water jet if required. Allow to dry.

2. For pinholes, apply repair tape, centered over puncture, roll firmly, remembering to remove release liner.

3. For damage other than pinholes, apply vapor retarder patch that extends 6 in. beyond opening; seal edges with seam tape.

4. Remove and reinstall concrete reinforcement if required for installation of patch.

3.5 CLEAN-UP

A. Upon completion of the vapor retarder system, the General Contactor shall remove all equipment, material, and debris from the work and storage area, and leave those areas in an undamaged and acceptable condition.

B. All water shall be removed from the vapor retarder before placement of concrete.

END OF SECTION

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SECTION 072700

AIR AND VAPOR BARRIER MEMBRANE

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the air and vapor barrier membrane as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Continuous air and vapor barrier applied over exterior face of CMU cavity wall back-up.

2. Air barrier in side CMU cavity wall.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Unit Masonry - Section 042000.

H. Below-slab vapor retarder - Section 072616.

1.4 QUALITY ASSURANCE

A. Submit in writing, a document stating that the applicator of the primary air/vapor barrier membranes specified in this section is recognized by the manufacturer as suitable for the execution of the Work.

B. Perform Work in accordance with the manufacturer's written instructions of the air/vapor barrier membrane and this specification.

C. Maintain one copy of manufacturer's written instructions on site.

D. At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the air/vapor barrier membrane manufacturers' representative.

E. Components used in this section shall be sourced from one manufacturer, including sheet membrane, air/vapor barrier sealants, primers, mastics, and adhesives.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

    a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
    b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
    c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
    d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
    e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings

applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's product information for all materials to be used. Data shall indicate that the submitted products are the products installed in the project.

C. Samples: Submit 12" x 12" sample of cured air and vapor barrier membrane.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

1. Store air barrier membranes, adhesives and primers at temperatures of 40°F and above to facilitate handling.

2. Keep solvent away from open flames or excessive heat.

3. Protect rolls from direct sunlight until ready for use.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Subject to compliance with requirements, provide products manufactured by Henry Company, or approved equal.

1. Henry products are specified as basis for project design.

2. Acceptable Alternate: "Perm-A-Barrier Liquid" manufactured by W.R. Grace, "Rub-R-Wall Airtight" by Rubber Polymer Corporation, Inc., or approved equal.

2.2 MATERIALS

A. Primary Membrane - Liquid Air/Vapor Barrier: Air-Bloc 32, a one component elastomeric membrane, spray, trowel or brush applied to a wet film thickness of 120 mils, and having the following characteristics:

1. Air Permeability: 0.0002 CFM/ @ 1.6 lbs/ to ASTM E 283 and resist suction pressure of 62.8 lbs/ maintained for 5 seconds with no increase in air leakage rate when tested at 1.6 lbs/.

2. Water Vapor Permeance: 0.8 perms per ASTM E 96.

3. VOC Content: No appreciable VOC (less than 100g/L).

4. Elastic Recovery: 75% per CAN/CGSB 37.58M86.

B. Transition Membrane: Blueskin SA, an SBS modified bitumen, self-adhering sheet membrane complete with a cross laminated polyethylene film, and having the following physical properties:

1. Thickness: 0.0394" (40 mils).

2. Air Leakage: <0.0001 CFM/ @ 1.6 lbs/ per ASTM E 283.

3. Vapor Permeance: 0.05 perms per ASTM E 96.

4. Low Temperature Flexibility: -22°F per CGSB 37-GP-56M.

5. Elongation: 200% per ASTM D 412 modified.

C. Through-Wall Flashing Membrane and Dampproof Course (Self-Adhering): Blueskin TWF, an SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, having the following physical properties:

1. Thickness: 0.0394" (40 mils).

2. Film Thickness: 9.0 mils.

3. Puncture Resistance: 40lbf per ASTM E 154.

4. Tensile Strength (film): 5000 psi ASTM D 882.

5. Tear Resistance: 13lbs. MD per ASTM D 1004.

6. Low Temperature Flexibility: -22° F per CGSB 37-GP-56M.

D. Transition Membrane Primer: Blueskin Primer, a synthetic rubber based adhesive type, quick setting, having the following physical properties:

1. Color: Blue.

2. Weight: 6.7 lbs/gal.

3. Solids by weight: 35%.

4. Drying time (initial set): 30 minutes.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions where the air and vapor barrier materials are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the work.

3.2 PREPARATION

A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants.

B. Cracks in masonry shall be sealed with a strip of Blueskin membrane lapped a minimum of 3" on both sides of the crack.

3.3 PRIMER FOR TRANSITION AND THROUGH-WALL FLASHING MEMBRANE

A. Apply primer for self-adhering membranes at rate recommended by manufacturer.

B. Apply primer to all areas to receive transition sheet and/or through-wall flashing membrane, as indicated on drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by Blueskin SA transition membrane or Blueskin TWF through-wall flashing membrane during the same working day must be re-primed.

3.4 TRANSITION MEMBRANE

A. Align and position Blueskin SA self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2" overlap at all end and side laps.

B. Tie-in to window frames, hollow metal door frames, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in drawings

C. Promptly roll all laps and membrane with a counter top roller to effect seal.

D. Ensure all preparatory work is complete prior to applying Air-Bloc 32.

3.5 THROUGH-WALL FLASHING MEMBRANE

A. Align and position the leading edge of Blueskin TWF self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls or self angles, partially remove protective film and roll membrane over surface and up vertically.

B. Press firmly into place. Ensure minimum 2" overlap at all end and side laps.

C. Promptly roll all laps and membrane to effect the seal.

D. Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry. Trim off excess as directed by the consultant.

E. Apply through-wall flashing membrane along the base of masonry walls, over windows, doors and all other wall openings. Membrane shall form continuous flashing and shall extend up a minimum of 8" up the back-up wall.

3.6 PRIMARY AIR/VAPOR BARRIER

A. When transition membrane is installed, apply by spray, trowel or brush a complete and continuous unbroken film of Air-Bloc 32 at a wet film thickness of 1/8". Overlap transition membrane a minimum of 1".

3.7 INSPECTION

A. Notify Commissioner when sections of work are complete so as to allow for review prior to installation of cavity wall insulation (Section 042000).

3.8 PROTECTION

A. Protect all work of this section from excessive exposure to sunlight and other elements; comply with manufacturer's recommendations.

END OF SECTION

SECTION 074196

POLYCARBONATE PANELS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SUMMARY

A. Section includes the interlocking cellular polycarbonate translucent glazed wall system as shown and specified. Work includes providing and installing:

1. Flat factory prefabricated polycarbonate panel.

2. Aluminum installation system.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Miscellaneous Metals – Section 055000.

H. Roofing - Section 075200.

I. Sheet metal flashing - Section 076200.

J. Sealant - Section 079200.

K. Glass and Glazing – Section 088000.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Submit manufacturer's product data. Include construction details, material descriptions, profiles and finishes of components.

C. Submit shop drawings. Include elevations, details, dimensions and attachments to other work.

D. Submit manufacturer's color charts showing the full range of colors available for factory finished aluminum.

1. Submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.

a. Panels: 14" x 28" units.
b. Factory Finished Aluminum: 5" long sections.
c. Corner assembly, panel and frame.

E. Samples: Submit the following:

1. Each aluminum frame section, 6" long.

2. Samples of aluminum illustrating specified finish.

3. Glazing gaskets, 6" long, each type.

4. Samples of glazing, each min. 6" x 6", in specified color.

F. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.

G. Submit current documentation indicating regular, independent quality control monitoring under a nationally recognized building code review and listing program.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 QUALITY ASSURANCE

A. The manufacturer providing the material or equipment specified in this Section must, for the past (3) three years, have been regularly engaged in the manufacture of material or equipment similar in type to that required for this Project. Such similar material or equipment provided by the manufacturer must have been in satisfactory service for not less than (3) three years.

B. Special Experience Requirements for Installer: The contractor or subcontractor performing the work of this Section must have at least five (5) years experience.

C. Performance Requirements: The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.

1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation, including wind deflection calculations, for the aluminum framing components.

a. Submit glazing manufacturer's load/span charts.

1.7 DELIVERY STORAGE AND HANDLING

A. Deliver panel system, components and materials in manufacturer's standard protective packaging.

B. Store panels on the long edge, several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.8 WARRANTY

A. Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work which fails in materials, finish, or workmanship within five (5) years of the date of delivery. Failure of materials or workmanship shall include leakage, excessive deflection, deterioration of finish on metal in excess of normal weathering and defects in accessories, insulated translucent sandwich panels and other components of the work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design:

1. Extech #3440 interlocking polycarbonate wall system, 40 mil clear multiwall, tongue and groove, polycarbonate and enhanced performance thermally-broken clear anodized frame, as manufactured by Exterior Technologies, Inc.; or equivalent proudct of Duo-Gard, Polygal, or approved equal complying with the design intent and all performance and material requirements.

2. Acoustic Panel: Acoustic laminated glass panels glazed into anodized aluminum angle frame mechanically fastened and acoustically sealed to Extech #3440 interlocking polycarbonate wall system.

B. Performance Requirements:

1. Air Infiltration: Per ASTM D 283 at a test pressure of 6.24 PSF, maximum air infiltration shall be 0.06 CFM/sq. ft. of glazing area.

2. Water Penetration: There shall be no water penetration when tested vertically per ASTM E 331 at a test pressure equal to 15% of the design pressure for this project.

3. Thermal Performance: U-Value .26 BTU/hr./sq. ft. deg F.

4. Light Transmission: 68% (clear color).

5. Flammibility: The system shall incorporate approved light-transmitting panels with a CC1 fire rating classification as tested per ASTM D 635 or equivalent.

6. Loading: The panel system shall be capable of meeting the design load for this project based on relevant code requirements and laboratory testing per ASTM E 330 shall evidence this fact.

2.2 MATERIALS

A. Aluminum Framing System

1. The extrusions shall be 6063-T5, 6005-T5 or 6105-T5 alloy and temper. All sections shall be formed true to detail and free from defects impairing appearance, strength or durability.

2. The rabbet depth at the edges of the framing shall (at an absolute minimum) be based on ¾" minimum engagement plus 1/8" for cutting tolerance plus 0.005 x that glazing dimension (in inches) which affects that rabbet. (For example, a 100" long glazing will require a minimum of ¾" + 1/8" + (.005 x 100) = 1.475".) Under no circumstances, even in the coldest possible weather, should panel engagement be less than ¾".

3. Gasketing is to be elastomeric, incorporating a low friction coating on the surfaces that contact the glazing. Gasketing shall be tested for chemical compatibility with the glazing, and test reports evidencing same shall be presented to the Commissioner.

4. Fasteners, where exposed, shall be stainless steel, 300 Series, with stainless backed neoprene washers. Where not exposed, they may be stainless or zinc-plated steel in accordance with ASTM Specifications A 165 or A 164.

5. Finish: Clear anodized; 215 R1D.

6. Aluminum and/or galvanized steel flashings and other brake metal components shall be minimum 0.040" thick (if aluminum) or 24 ga. thick (if steel), or thicker where so specified on the drawings. The finish on this metal shall match as closely as possible that which is on the extruded aluminum framing members.

7. Attachment of glazing sheets to the intermediate structural elements (i.e. purlins, or girts) or to structural members parallel to the translucent panels shall be achieved by means of one of the following:

   a. One-piece aluminum clips, which are designed with protruding "T" portions which engage the corresponding grooves extruded in the polycarbonate panels and thereby constrain the sheets. These clips are face mounted on the transverse or parallel structural elements.

      OR

   b. One-piece stainless steel clips, which are designed with protruding "T" portions which engage the corresponding grooves extruded in the polycarbonate panels and thereby constrain the sheets. This clip is mounted on a perpendicular (to the glazing panels) face of the transverse structural element.

B. The 40 mm polycarbonate glazing panels for the system shall conform to the following:

   1. Appearance

      a. The extruded panels shall be uniform in color with an integral extruded multi-cell core. The panel's exterior skins shall be interconnected and spaced apart by supporting continuous ribs, perpendicular and/or be diagonal "X" Pattern to the skins.
      b. Panels shall consist of a polycarbonate resin with permanent, co-extruded, ultraviolet protective layers on the exterior sides of the panels. This protective layer shall be co-extruded by the manufacturer during the original extrusion of the panel. Post-applied coatings or films of dissimilar materials are unacceptable.
      c. These panels shall be formed using resin which contains small glass beads. These beads provide diffusion of the light as it passes through the panels.
      d. Panel thickness shall be a minimum 1-9/16" (40 mm).

   2. Panel weight shall be nominally 0.83 lbs. per sq. ft.

   3. Panel width shall be nominally 19-11/16" (500 mm).

   4. The panels shall be designed and formed with interlocking sides so that multiple panel installations can be achieved without the need to introduce independent mullion framing members.

      OR

   5. The panels shall be designed and formed in a manner that allows the insertion of optional internal reinforcement bars, each in close proximity to the interlocking joints of a multiple panel application.

C. Translucent Panel System

1. Panel shall be extruded in one single length. Transverse connections are not acceptable.

2. Perimeter framing members are to be dry glazed profiles, using no welding, or adhesives.

3. Perimeter framing members, exclusive of cover caps, shall incorporate an integral structural polyurethane thermal break.

4. In general, concealed fasteners are to be used for all aluminum framing. In system construction, the use of adhesives, plastic welding, or sealants is not allowed.

5. Panels shall be supplied with closed cell, factory applied, and continuous gasket material on the panel tongue.

6. The interior cells of the cellular polycarbonate sheets shall be blown clean prior to being sealed. The top and bottom of each sheet shall be sealed with an air permeable filter tape.

7. The open end of each panel shall rest on a continuous metal setting fin or setting block which is designed to allow atmospheric air to reach the air permeable tape at the bottoms of the panels.

8. Glazing shall be installed in accordance with panel and system manufacturer's guidelines.

9. The color of the panels shall be Clear.

10. Acoustical glazing infill shall consist of the following: a 3/8" laminated glass panel (comply with Section 08800) and a 5/8" cellular polycarbonate panel (comply with item C.1 through C.9 above). The glass panel shall be constrained within the frame by means of a field applied continuous glazing stop, while the polycarbonate shall be held in place by the perimeter frame removable stop. The resulting air space shall be ventilated as required to minimize condensation and the intriduction of dirt and debris within the space.

D. Fasteners

1. Bolts, anchors and other fastening devices shall be as required for the strength of the connections and shall be suitable for conditions encountered. Washers shall be of the same metals as fasteners.

2. Fasteners exposed to the weather shall be 300 Series stainless steel and shall utilize stainless steel washers with neoprene or EPDM seals.

3. Concealed fasteners shall be stainless steel or zinc plated steel as per ASTM A 165.

2.3 WORKMANSHIP

A. Carefully and accurately design, fabricate and assemble work with proper provision for thermal contraction and expansion. Work shall conform to profiles and sections noted

on the shop drawings. Work shall be assembled with joints in a neat and finished manner.

B. Fasteners: Of a strength and spacing sufficient to meet the testing requirements as stated herein and to resist the specified load requirements or code requirements.

C. Protect contact points between unprotected dissimilar metals (except stainless steel) using continuous separators of FRP or PVC tape (or approved equal).

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, supporting structure and installation conditions. Do not proceed with panel erection until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Metal Protection

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.

3. Where aluminum will contact pressure-treated wood, separate dissimilar materials by methods recommended by manufacturer.

3.3 INSTALLATION

A. Install the panel system in accordance with the manufacturer's installation recommendations and approved shop drawings.

1. Anchor component parts securely in place by permanent mechanical attachment system.

2. Accommodate thermal and mechanical movements.

3. Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weathertight construction.

B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturer's installation instructions.

C. The panel system manufacturer shall make a minimum of three separate site visits while the work in this section is being performed including one visit at the commencement of installation and one visit at substantial completion of the work.

3.4 CLEANING

A. Clean the panel system inside and outside, immediately after installation, according to manufacturer's written recommendations.

END OF SECTION

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SECTION 074223

PREFORMED WOOD EXTERIOR CEILING PANELS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the preformed wood exterior panel work as shown on the drawings and specified herein, including but is not necessarily limited to the following:

1. Prefinished high-density wood veneer panel with resin core exterior ceiling pads

2. Trim and accessories required for complete installation.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Insulation - Section 072100.

H. Joint sealers - Section 079200.

1.4 QUALITY ASSURANCE

A. Qualifications of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Manufacturer's Data: Submit standard detail drawings and installation instructions for preformed panel system. Include manufacturer's certification or other data

substantiating that the materials and finishes comply with the requirements. Indicate by copy of transmittal that the Installer has received a copy of the installation instructions.

C. Samples: Submit minimum four, 24" long by full width samples of panel, and fasteners, complete with factory applied finish indicating full range of grain and coloration. Samples will be reviewed by Commissioner for pattern, texture and color range only. Installed panels must be within the pre-selected appearance range. Compliance with other requirements is the exclusive responsibility of the Contractor.

D. Shop Drawings: Submit shop drawings showing the profiles of panel units, and the details of jointing (gaskets, if any), supports, anchorages, trim, flashing, and accessories and grain direction. Show details of weatherproofing at edges, terminations, and penetrations of the panel work. Show small scale layout and elevations of entire work.

E. Indicate locations of reinforcement strips, structural support requirements, and other pertinent data.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 DELIVERY, STORAGE AND PRODUCT HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened packaging with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in accordance with the manufacturer's instructions in unopened packaging until ready for installation. Store material in a covered area, away from water or a flat, level surface with adequate support to prevent sagging.

C. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.8 ACCLIMIZATION

A. All boxes shall be opened and all components removed from the packaging and stacked flat spacers between the pieces in their final environment for a minimum 3 - 4 days prior to installation.

1.9 COORDINATION

A. Coordinate panel work with work of other trades that penetrate or connect panels. Openings required in panels to accommodate penetrations must be neatly and accurately made.

B. Provide concealed reinforcing plates, anchors and supports to receive items mounted in panels as required to prevent damage or deflection of panels.

C. Provide all necessary trim, flashing, sealant to ensure watertight integrity of panel system where penetrations occur.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Provide high density wood veneer exterior panel with resin core; basis of design is "Meteon" by Trespa; provide the speicifed product or equivalent of Prodema, or approved equal.

B. Panel Physical Dimensions and Characteristics:

1. Thickness: 1/2"

2. Color: As selected by the Commissioner.

3. Panel Lengths: As indicated on Drawings.

C. Mounting: Concealed 'Z-Clip' fasteners to an aluminum subframe.

D. Trim Material: Furnish necessary trim in conjunction with the panel system, including feature strips, top, bottom, corner, end units, etc. All exposed members finished to match panels.

E. Sealant: One part polysulfide or polyurethane conforming to Fed. Spec. TT-S-00230-C, approved by panel manufacturer.

F. Fasteners: Fasteners shall be stainless steel, in conjunction with EPDM washers. Heads are to be shop painted to match panel. See drawings for locations. Fasteners are to be mounted to 7/8-inch deep continuous stainless steel furring channels.

G. Insulation: As specified in Section 072100.

2.2 FABRICATION

A. Comply with dimensions, profile limitations, and fabrication details shown and specified.

B. Fabricate components of the system at factory, ready for field assembly.

C. Fabricate components and assemble units to comply with manufacturer's published performance requirements.

D. Factory-apply specified finishes in conformance with manufacturer's standards, and according to coating manufacturer's instructions.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where preformed panel system is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. General: Comply with panel manufacturer's instructions for assembly and installation.

B. Anchor component parts of the preformed panel system securely in place, providing for necessary thermal and structural movement. Drill holes in structural steel members as required for anchorage in accordance with approved shop drawings.

C. Tolerances: Erect the panels plumb, level and true to line with tolerances not exceeding 1/8" in runs of 20'-0", and within 1/16" of adjoining faces and of alignment of matching profiles.

D. Damaged Material: Remove and replace panels and component parts of the work that have been damaged (including finish) beyond successful repair, as directed by the Commissioner. Repair minor damage.

3.3 CONTROL SECTION

A. Prior to general installation of panels, install a section to be used as a "control section" in accordance with approved shop drawings.

B. Commissioner shall review and inspect control section for visual appearance only. Replace unsatisfactory work as directed until control sample is acceptable.

3.4 CLEANING AND PROTECTION

A. Clean exposed surfaces of preformed panel work promptly after completion of installation. Comply with recommendations of the panel manufacturer.

B. Protection: The Installer shall advise the Contractor in writing of protection and surveillance procedures that can be foreseen as needed to ensure that the work will be without damage or deterioration at the time of final acceptance after completion of other construction work.

END OF SECTION

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SECTION 075200

MODIFIED BITUMEN ROOFING

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: heat island effect, roof; use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the modified bitumen roofing as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. SBS modified bitumen roof membrane.

2. Roof insulation.

3. SBS modified flashing.

4. Accessories.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Wood blocking - Section 062000.

H. Flashing and sheet metal - Section 076200.

I. Roof accessories - Section 077100.

J. Roof drains - Division 22.

K. Roof Snow Melting System – Section 26250

1.4 QUALITY ASSURANCE

A. Manufacturer: The manufacturer providing the material or equipment specified in this Section must, for the past three years, have been regularly engaged in the manufacture of material or equipment similar in type to that required for this Project. Such similar material or equipment provided by the manufacturer must have been in satisfactory service for not less than three years.

B. Special Experience Requirements for Installer: The contractor or subcontractor performing the work of this Section must have at least five (5) years experience.

C. Submit the following:

1. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.

2. Letter from the primary roofing manufacturer stating that the proposed application will comply with the Manufacturer's requirements in order to qualify the project for the specified guarantee.

D. Pre-Roofing Conference: Prior to installation of roofing and associated work, meet at project site, or other mutually agreed location, with Installer, roofing manufacturer, installers of related work, Contractor and other entities concerned with roofing performance, including the Commissioner and City of New York. Record discussions and agreements and furnish copy to each participant. Provide at least seventy-two (72) hours advance notice to participants prior to convening pre-roofing conference. Review methods and procedures related to roofing work, including but not limited to the following:

1. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.

2. Review roofing system requirements (drawings, specifications and other Contract Documents.

3. Review required submittals, both completed and yet to be completed.

4. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.

5. Review required inspection, testing, certifying and material usage accounting procedures.

6. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).

E. UL Listing: Provide labeled materials which have been tested and listed by UL in "Building Materials Directory" for application indicated, with "Class A" rated materials/system for roof slopes shown.

1. Provide roof covering materials bearing Classification Marking (UL) on bundle, package or container indicating that materials have been produced under UL's Classification and follow-up Service.

F. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface Burning Characteristics: ASTM E 84.

2. Fire Resistance Rating: ASTM E 119.

3. Combustibility Characteristics: ASTM E 136.

G. Provide roofing system and component materials which have been evaluated by Factory Mutual System for fire spread, wind-uplift Class 90, and hail damage and are listed in "Factory Mutual Approval Guide" for Class I construction. System shall also meet ASCE-7 for wind uplift standards.

1. Provide roof covering materials bearing FM approval marking on bundle, package or container, indicating that material has been subjected to FM's examination and follow-up inspection service.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).

b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.

1. For asphalt bitumen, provide label on each container or certification with each load of bulk bitumen, indicating flash point (FP), finished blowing temperature (FBT), softening point (SP) and equiviscous temperature (EVT).

C. Samples: Submit for the following products:

1. Cap sheet, of color required.

2. Flashing sheet, of color required.

3. Aggregate surfacing material in gradation and color required.

4. Walkway pads or rolls, of color required.

D. Pre-Roofing Conference: Submit copies of pre-roofing conference records.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

D. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

1.7 JOB CONDITIONS

A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.

1.8 PRODUCT HANDLING

A. Store and handle roofing sheets in a manner which will ensure that there is no possibility of significant moisture pick-up.

B. Store in a dry, well ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing work is not in progress. Store rolls of felt and other sheet materials on end on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.

1.9 WARRANTY

A. Special Project Warranty: Provide written warranty, signed by Manufacturer of primary roofing materials and his authorized Installer, agreeing to replace/repair defective materials and workmanship as required to maintain roofing system in watertight condition, warranty to include pitch pockets.

B. Warranty period for manufacturer is twenty (20) years after date of Substantial Completion; no dollar limit.

C. Warranty period for installer is two (2) years after date of Substantial Completion; no dollar limit.

PART 2 PRODUCTS

2.1 ROOFING SYSTEM

A. Roofing system to be a multiple layer, SBS modified bitumen (polyester reinforced), granule surfaced, equal to Siplast Paradiene 30 CR FR, with white synthetic chips, or approved equal made by Johns Manville, Tamko, or approved equal.

B. Base Sheet: ASTM D 4897, Type II, venting, nonperforated, heavyweight, asphalt-impregnated and -coated, glass-fiber base sheet with coarse granular surfacing or embossed venting channels on bottom surface

C. Roofing Membrane Sheet: ASTM D 6164, Grade S, Type I or II, polyester reinforced, SBS-modified asphalt sheet; suitable for application in cold applied adhesive.

D. Membrane Cap Sheet: ASTM D 6164, Grade S, Type I or II, polyester reinforced, SBS-modified asphalt sheet; granular surfaced, suitable for application in cold applied adhesive.

E. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt based, one or two part, asbestos-free, cold applied adhesive that is compatible with roofing membrane and flashings.

2.2 ROOF INSULATION

A. Polyisocyanurate Board Roof Insulation: Rigid, sloped (1/4" per foot minimum) and flat, cellular thermal insulation with polyisocyanurate closed-cell foam core and manufacturer's standard facing laminated to both sides; complying with ASTM C 1289, average LTTR value as designated at mean temperatures indicated, after testing per ASTM C 1303 as follows:

1. Surface Burning Characteristics: Maximum flame spread of 25.

2. LTTR R-Value: 6.0/inch at 75 deg. F.

B. Acceptable Product/Manufacturer: "Enrgy 3" by Johns Manville, or equal by Apache, GAF, or approved equal.

1. Roof membrane manufacturer must approve insulation in writing.

2.3 MODIFIED BITUMINOUS BASE FLASHING

A. Provide modified bituminous base flashing system as determined by edge details and that is acceptable to roofing manufacturer.

2.4 CANT STRIPS

A. Provide cant strips formed of rigid insulation matching roof insulation or molded asphalt or coal tar impregnated organic fiber insulation material, 45° cant, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

A. Lead flashing sheet of 4 lb. flashing lead for pipe flashing of common desilverized pig lead; all other roof flashing shall be stainless steel.

B. FM approved mechanical fasteners for attaching insulation to substrate.

C. Roof Walkway: Preformed, skid-resistant boards consisting of modified asphalt, reinforcements and fillers with a ceramic granule surface on both sides. Dimension shall be 32" x 32" x 5/16". "Paratread" by Siplast", "DynaTred Roof Walkway" by Johns Manville or approved equal.

D. Roof Membrane Protective Course: modified asphalt membrane protective course. "Paratread" by Siplast" or approved equal.

E. Pitch Pockets: J.M. Chem-Curb system, consisting of a preformed structural urethane outer shell filled with a two-part sealant J.M. Flashing Cement. A two-part sealant adhesive equal to J.M. Flashing Cement shall be used to bond the shell to the roof finished surface as well as seal the edges.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where modified bituminous roofing is to be installed for compliance with requirements. Report conditions detrimental to built-up roofing work. Proceed after unsatisfactory conditions are corrected to permit proper installation of the work.

B. Clean substrate of dust, debris, and other substances detrimental to built-up roofing work. Remove sharp projections.

3.2 INSTALLATION, GENERAL

A. Install built-up roofing in accordance with manufacturer's recommendations and requirements of authorities having jurisdiction.

B. Substrate shall be clean, smooth and dry, free of projections which might puncture the felts.

C. Insure that all drains, curbs, blocking and roof penetrating components are in place before any roofing work starts. See that all roof drains are set 1" below the normal finish roof level to insure that additional flashing around the drains will not be built-up above the normal roof level and prevent proper drainage.

D. Install flashing, including counter flashing, as roof application progresses. If delay is unavoidable, trowel the top of the flashing with flashing cement close to the joint to prevent water from entering behind the flashing until the counter flashing is in place.

E. Start roofing application at far points of the deck and work toward area where base materials are fastened to the roof deck (to minimize traffic over newly applied roofing).

F. Weigh down all membrane edges left incomplete before splicing with other sections of membrane.

G. Prohibit phased application in which saturated felts are left exposed overnight or longer before top plies and topcoat are applied. Place aggregate surface on same day as felts.

H. Inspect roof drains for obstructions and debris after the roofing work is completed.

3.3 INSULATION

A. Extend insulation and cover board full thickness over entire surface to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation and mastic.

B. Apply a double layer of insulation of the required thickness, to make up the total thickness. Stagger joints between layers as recommended by the manufacturer.

C. Set first layer of insulation using mechanical fasteners spaced in accordance with FM requirements to meet I-90 wind uplift. Apply second layer of insulation and cover board in cold-applied adhesive.

D. Do not advance the laying of insulation ahead of roofing more than necessary for sequence of operations. Cover insulation exposed at end of each day's work (and when rain threatens) with waterproofing materials. Do not permit insulation to become wet. Remove and dispose of insulation which has become wet; replace before proceeding with roofing work.

E. Lay with edges in moderate contact but do not force into place.

F. Stagger end joints; or tape joints where recommended by the manufacturer.

G. Install temporary water cut-offs at completion of each day's work and remove upon resumption of work.

3.4 ROOFING

A. Install modified bituminous membrane sheets according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, adhering to substrate in cold applied adhesive.

B. Shingling of Plies: Lay plied bituminous membranes over insulation and Perlite board with felts shingled uniformly to achieve the required plies in accordance with manufacturer's instructions.

C. Set on Accessories: Where small roof accessories are set on built-up roofing membrane, set metal flanges in a bed of roofing cement, and seal penetration of membrane with bead of roofing cement.

D. Walkway Cap Sheet Strips: Install roofing membrane walkway cap sheet strips over roofing membrane in cold-applied adhesive.

3.5 COMPOSITION FLASHING AND STRIPPING

A. Provide composition flashing at cant strips and other sloping and vertical surfaces, and at roof edges, and at penetrations through roof. Nail or provide other forms of mechanical anchorage of composition flashing to vertical surfaces, as recommended by manufacturer of primary roofing materials. Except where concealed by elastic flashing, apply a heavy coating of roofing cement over composition flashing.

3.6 ROOF DRAINS

A. Install 1-1/2" x 18" Tapered Edge Strips to form a gradually tapered sump transition from top of insulation to roof drain flange. Minimum sump size to be 4 ft. by 4 ft.

B. Install roofing plies, starting at the low point (roof drain) in a shingle fashion so that four plies are provided, trimming felt plies at edge of drain flange.

C. Install a 4# lead flashing (minimum size 30" x 30"), set in bed of flashing cement, on top of roofing plies. Form lead to shape of sump and into drain bowl, trimming neatly approx. 1" beyond ring. Install clamping ring immediately.

D. Prime top surface of lead with asphalt primer. Allow to dry completely.

E. Strip in lead with one ply of SBS Modified Bitumen membrane, extending from clamping ring out a minimum of 6" beyond lead.

END OF SECTION

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SECTION 076200

SHEET METAL WORK

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the sheet metal work, as indicated on the drawings and/or specified herein, including but not limited to, the following:

1. Stainless steel cap metal flashing.

2. Stainless steel through wall flashing.

3. Field fabricating (including bending, cutting, soldering, etc.), if required, of stainless steel flashing.

4. Stainless steel flashing elsewhere, where metal flashing is indicated on drawings.

5. Separation of contacting surfaces of dissimilar metals.

6. Aluminum gutters and downspouts.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Unit masonry – Section 042000.

H. Roofing - Section 075200.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Shop Drawings: Submit, showing all materials, finishes, fastenings, joint details, fabrication, construction and relation to adjoining construction.

C. Samples: Submit 12" x 12" samples of flashing materials and finishes.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 WARRANTY

A. The Contractor shall warrant that all Metal Flashing Work executed under this Section will be free from defects in materials and workmanship for a period of two (2) years from date of acceptance of the Project, and he shall remedy any defects in the Metal Flashing Work.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the City of New York.

PART 2 PRODUCTS

2.1 STAINLESS STEEL MATERIALS

A. Stainless Steel Flashing Materials

1. Stainless Steel Flashing: ASTM A167, Type 304, stainless steel, with 2D finish, dead soft temper, fully annealed, as manufactured by International Nickel Co., Republic Steel Corp., United States Steel, Washington Steel Corp. or approved equal. Thickness of stainless steel shall be as listed below, unless otherwise indicated on the drawings:

   a. Concealed Flashings: .012" thick, thirty (30) gauge (U.S. Standard).
   b. Exposed Flashings: .015" thick, twenty eight (28) gauge (U.S. Standard).
   c. Edge Strips: .025" thick, twenty four (24) gauge (U.S. Standard).

2. Through wall flashing shall have sawtooth ribs at three (3) inch interval as manufactured by Keystone Flashing Co., or approved equal.

3. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel.

4. Solder: Composed of sixty (60) percent block tin and forty (40) percent pig lead, except that solder at seams exposed to public view shall be eighty (80) percent tin and twenty (20) percent lead.

5. Flux: An acid type flux manufactured specifically for soldering stainless steel, as approved.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.2 ALUMINUM GUTTERS AND DOWNSPOUTS

A. Provide aluminum gutters and downspouts fabricated of formed aluminum, 0.050" thick, alloy 5005-H154, smooth, no pattern.

B. Gutters shall be manufactured in 10'-0" lengths, half-round profile, tapered and notched to provide a 1" telescoping lap joint and manufacturer's standard cover plate. Gutters shall be pre-punched at 12" o.c. to provide for thermal movement after installation.

1. Provide manufacturer's standard support brackets and interior straps for installation at 24" o.c. Brackets shall be of a compatible material to gutter, with matching finish and color.

C. Downspout shall be manufactured in 10'-0" lengths, rectangular closed-face with mitered elbows, factory offset on one end to provide for a 3/4" telescope joint. Downspout shall contain a factory mounted back, non-sealed to allow seepage of water in overflow conditions.

1. Elbows for downspouts shall be of welded construction, with matching finish applied after welding. Such finish shall be of quality equal to finish for non-welded parts. Grinding and spray painting of parts to match will not be permitted. Elbows shall be provided with a factory offset on its lower end to allow a 3/4" telescope joint.

2. Provide manufacturer's standard wall brackets of compatible material to downspout with matching finish and color.

D. Roof Mounted Splash Pans: Fabricate from 0.040-inch thick formed aluminum.

E. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.

2. Custom color and gloss as selected by the Commissioner.

F. Provide units manufactured by MM Systems, or equal made by Cheney, Hickman, or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where sheet metal work is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 METAL FLASHING INSTALLATION

A. Reference Standard: Conform to the requirements of Edition of the Sheet Metal and Air Conditioning Contractors Association (SMACNA) Architectural Sheet Metal Manual.

B. General: Fabricate and install metal flashing work in accordance with details and specifications of above Reference Standard, with manufacturer's instructions, and as herein specified, to provide a watertight installation. Apply metal flashing to smooth, even, sound, clean, dry surfaces free from defects. Make provisions to allow for expansion and contraction of metal flashing work. Wherever practicable, shop form all metal flashing work and deliver ready for installation. Form metal flashing work accurately to required profiles, with flat surfaces, straight edges and corners, free from defects. Fold exposed metal edges back not less than 1/2" and form drip.

C. Nailing: Confine to sheets twelve (12) inches or less in width. Confine nailing to one edge only, locate nails where concealed. Use No. 12 x 1" long flat headed, annular threaded, Type 302 stainless steel nails for nailing to wood blocking; use one (1) inch long masonry nails for nailing to concrete. Space nails four (4) inches o.c. maximum.

D. Cleating: Use cleats where sheets are more than twelve (12) inches in width. Space cleats approximately twelve (12) inches o.c.. Cleats two (2) inches wide by three (3) inches long, of the same material and weight as the metal flashing being installed. Secure one end of the cleat with two (2) nails and fold edge back over the nail heads. Lock other end into seam or into folded edge of metal flashing sheets. Pre-tin cleats for soldered seams.

E. Joining: Join metal flashings with one (1) inch locked and soldered seams except at slip joints. Mallet seams flat and solder full length of seam as specified below.

F. Soldering: Clean and pre-tin edges of metal flashing to be soldered before soldering is begun with solder on both sides for a width of not less than 1-1/2". Solder slowly with well heated metal surfaces. Use ample solder. Show not less than one full inch of evenly flowed solder on seam. Seams shall have a liberal amount of flux brushed in before soldering is commenced. Where soldering paste or killed acid is employed as a flux, soldering shall follow immediately after application of the flux. Upon completion of soldering, clean surfaces of all flux.

G. Slip Joints: Locate slip joints not more than twenty four (24) feet apart and not more than eight (8) feet from corners. Form slip joints as three (3) inch wide joints with cover piece behind flashing, and fill locked ends neatly with sealant.

H. Cap Flashing: Install over base flashings, in eight (8) to ten (10) foot lengths, lapped six (6) inches at ends. Cap flashing shall be increased longitudinally to produce spring action to hold bottom edge of cap flashing firmly against base flashing. Cap flashing shall lap base flashing at least four (4) inches, with exposed bottom edge at a forty five (45) degree angle downward and folded back on underside at least 1/2" to form drip. Make cap flashing continuous at corners and angles.

I. Miscellaneous Flashing: Provide all other miscellaneous metal flashing not specifically mentioned herein, but indicated on drawings and/or required to provide a watertight installation.

J. Separation of Dissimilar Materials: Back paint surfaces of metal flashing in contact with dissimilar metals or with concrete or masonry with bituminous paint.

K. Reglets

1. Provide watertight reglets in masonry and concrete work to receive cap flashing. Form reglets of stainless steel using same thickness as stainless steel sheet metal specified.

2. In masonry work use open or closed slot reglets with slat at least one (1) inch deep and 3/16" wide. Provide hook dams or turn-ups for anchoring securely into mortar joints. Insert cap flashing into slot full depth using button punch or lead wedges to lock in place.

3. In concrete work, use open or closed slot reglets with slot sloped upward at forty five (45) degrees, at least one (1) inch deep and 3/16" wide. For fastening reglets

to concrete forms use double-head stainless steel nails spaced twelve (12) inches apart maximum.

4. Insert cap flashing full depth into reglet slot, and wedge in place using lead strips spaced on twelve (12) inch centers maximum or lead caulking rope. When lead strips are used for continuous caulked reglets, use approved weather-resistant fibrous compounds.

L. Through-the-Wall Flashings: Provide through-the-wall flashings as shown. Form bonding features so as not to puddle water on surface. Lap cross joints to interlock design pattern at least three (3) inches. Stop typical flashings in mortar joint 1/2" from exterior face of wall.

M. Gutters

1. General: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 30" apart. Attach ends with rivets and solder to make watertight. Slope to downspouts

2. Support Bracket Installation: Locate low and high points of gutter installation and chalk a guide line to allow a maximum 1/4"/40'-0" slope. Install support brackets at 30" on center aligned with the chalk or other type of guide line. Take care to avoid locating bracket directly over downspout outlet locations. Attach brackets with non-corrosive screw anchors.

3. Gutter Installation: Install gutter sections into support brackets. Insert each telescoping section into previous section for a distance of 1". Provide sealants and fasteners as recommended by manufacturer. Attach rear upper portion of gutter through pre-punched elongated holes at 12" o.c.

4. Inside Strap Installation: Install straps at 30" o.c. alternating with support brackets. Strap shall be hooked into leading edge (bead) of gutter and riveted at its rear side. In no case shall strap be nailed, screwed, or otherwise fastened which would restrain thermal movement of product.

5. Expansion Joints: At 40'-0" intervals, or as shown on plans, install manufacturer's standard elastomeric expansion joint assembly.

6. Miter Corners: Install manufacturer's welded miter units at locations shown on plans. Corners shall have 30" legs, pre-punched, notched, and telescoping to match gutter. All units shall be finished after fabrication; grinding and touch-up painting will not be allowed.

7. End/Caps Terminations: Install manufacturer's end caps at all end terminations. End caps shall be riveted at 2" o.c. and sealed.

8. Outlets: Locate all outlet locations and field cut hole in a neat workmanlike manner. Hole shall be located a distance of 1" from backside of gutter. Insert manufacturer's stainless steel outlet, fasten in place with 4 rivets (one being located on each flange), and seal.

N. Downspouts

1. Install downspouts with brackets 24" o.c.; attach brackets to structure, use non-corrosive screw anchors.

2. Join sections with manufacturer's standard telescoping joints. Provide fasteners designed to hold downspouts securely 1" away from walls, locate fasteners at top and bottom and at approximately 60" o.c. in between.

O. Splash Pans: Install where downspouts discharge on low-slope roofs. Set in asphalt roofing cement or elastomeric sealant.

P. Scupper: Continuously support scupper, set to correct elevation, and seam frames to interior wall face, over cants or tapered edge strips, and under roofing membrane, unless otherwise indicated on the drawings.

END OF SECTION

SECTION 077100

ROOF SPECIALTIES AND ACCESSORIES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the roof specialties and accessories as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Roof expansion joints.

2. Aluminum copings and sills.

3. Roof hatches.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Roofing - Section 075200.

H. Sheet metal flashing - Section 076200.

I. Roof Snow Melting System – Section 262500

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Before any roof specialties and accessories are delivered to the job site, submit shop drawings showing profiles and anchoring devices.

C. Samples: Submit 6" long sample of coping showing approved profile and specified finish.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 ROOF EXPANSION JOINTS

A. Provide neoprene and metal insulated expansion joint assemblies made of 1/16" stainless steel flanges and insulated with 1/2" thick foam insulation. Provide pre-fabricated units for corners and intersections and provide manufacturer's standard splicing strips and adhesives for installation and splicing of units.

B. Provide "Expand-O-Flash" units by Johns Manville or equal made by Miscellaneous Mfg. Co., Grefco, E-Z Flash, or approved equal.

2.2 ALUMINUM COPINGS AND SILLS

A. Fabricate of 0.1019" (10 ga.) and 0.1285 (8 ga.) thick aluminum alloy 5005-H154, smooth, no pattern.

B. Provide concealed splice plates 12'-0" o.c. fabricated of 0.050" thick aluminum to match exposed aluminum; finished to match exposed aluminum.

C. Provide pre-fabricated mitered and welded corner units.

D. For copings, provide galvanized steel anchor plates, anchors spaced 6'-0" o.c. and snap-lock coping design; all anchors concealed.

E. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

1. Custom color and gloss as selected by the Commissioner.

2. At Cattery: Custom gold/ metallic yellow color as selected by the Commissioner.

F. Provide units manufactured by MM Systems, Cheney, Hickman or approved equal.

2.3 ROOF HATCH

A. Provide 36" x 36" "Type E" aluminum roof hatch, ladder-access type units as manufactured by Bilco, or equivalent product of Babcock-Davis, Milcor or approved equal, with 1" rigid insulation at curbs and door and standard self-lifting mechanism. Provide manufacturer's standard stainless steel hardware, including hold-open device, hinges, latch and operating handles for inside operation. Construct units for 40 lbs. per sq. ft. live load.

B. Safety Railing System: Manufacturer's standard complete system including rails, clamps, fasteners, safety barrier at railing opening, and all accessories required for a complete installation.

1. Height: 42 inches above finished roof deck.

2. Test load per code requirements.

3. Provide self-latching gate fabricated of same materials as safety railing system.

C. Finish: Mill.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where roof specialties and accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

B. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

C. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.

D. Operational Units: Test operational units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

E. Roof Expansion Joint:

1. Provide uniform profile throughout the length of the installation, and do not stretch the elastic sheet.

2. Nail metal flanges to curbs and cant strips securely as recommended by the manufacturer for waterproof construction.

3. Anchor edges of expansion joint units in the manner indicated, complying with manufacturer's instructions. Provide not less than 4" embedment in bituminous membranes, with hot bitumen or with roofing cement. Cover with composition stripping as specified for the membrane work.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal and plastic surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

B. Clean and polish plastic skylight units, inside and out, not more than 5 days prior to date of substantial completion.

END OF SECTION

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SECTION 078413

FIRESTOPS AND SMOKESEALS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the firestops and smokeseals as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

4. Sealant joints in fire-resistance-rated construction.

5. Construction joints, including those between top of fire rated walls and underside of floors above.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Cast-in-place concrete - Section 033000.

H. Unit masonry - Section 042000.

I. Joint sealers - Section 079200.

J. Drywall - Section 092900.

K. Piping penetrations - Division 22.

L. Duct penetrations – Division 23.

M. Cable and conduit penetrations - Division 26.

1.4 REFERENCES

A.	ASTM E 814	"Standard Method of Fire Tests of Through-Penetration Firestops."
B.	UL 1479, UBC 7-5	(Both are same as A. above).
C.	ASTM E 119	"Standard Method of Fire Tests of Building Construction and Materials."
D.	UL 263, UBC 7-1	(Both are same as C. above).
E.	UL 2079	"Tests For Fire Resistance of Building Joint Systems."
F.	ASTM E 1399	"Test For Dynamic Movement Conditions."
G.	ASTM E 1966	(Same as E. above).

H. Published Through-Penetration Systems by recognized independent testing agencies.

1. UL Fire Resistance Directory, Volume II of current year.

2. Warnock Hersey Certification Listings, current year.

3. Omega Point Laboratories, current year.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

    a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
    b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
    c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
    d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
    e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Submit manufacturer's product literature for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance, limitation criteria, test data and indication that products comply with specified requirements.

C. Submit shop drawings detailing materials, installation methods, and relationships to adjoining construction for each firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspection agency evidencing compliance with requirements for each condition indicated.

    1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.

D. Material Safety Data Sheets: Submit MSDS for each firestop product.

E. Submit qualifications of firestop installer, including letter from firestop manufacturer of products proposed to be installed, wherein manufacturer approves or recognizes as trained/ or certifies installer for installation of that manufacturer's products.

F. Manufacturer's Letters: For installations or configurations not covered by a UL or Warnock Hersey design number, a recommendation shall be obtained from the manufacturer, in writing, for the specific application.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 QUALITY ASSURANCE

A. General: Provide firestopping systems that are produced and installed to resist the spread of fire, and the passage of smoke and other gases.

B. Firestopping materials shall conform to Flame (F) and Temperature (T) ratings as required by local building code and as tested by nationally accepted test agencies per ASTM E 814 or UL 1479. The F rating must be a minimum of one (1) hour but not less than the fire resistance rating of the assembly being penetrated. T rating, when required by code authority, shall be based on measurement of the temperature rise on the penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.

C. Firestopping products shall be asbestos free and free of any PCBs.

D. Do not use any product containing solvents or that requires hazardous waste disposal.

E. Do not use firestop products which after curing, dissolve in water.

F. Do not use firestop products that contain ceramic fibers.

G. Firestopping Installer Qualifications: Firestop application shall be performed by a single firestopping contractor who specializes in the installation of firestop systems, whose personnel to be utilized have received specific training and certification or approval from the proposed respective firestop manufacturer, and firestop installer shall have a minimum of three years experience (under present company name) installing firestop systems of the type herein specified.

H. Mock-Up: Prepare job site mock-ups of each typical Firestop System proposed for use in the project. Approved mock-ups will be left in place as part of the finished project and will constitute the quality standard for the remaining work.

I. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

2. For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.

3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original unopened containers with manufacturer's name, product identification, lot numbers, UL or Warnock Hersey labels, and mixing and installation instructions, as applicable.

B. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.

C. All firestop materials shall be installed prior to expiration of shelf life.

1.9 PROJECT CONDITIONS

A. Verify existing conditions and substrates before starting work

B. Do not use materials that contain solvents, show sign of damage or are beyond their shelf life.

C. During installation, provide masking and drop cloths as needed to prevent firestopping products from contaminating any adjacent surfaces.

D. Conform to ventilation requirements if required by manufacturer's installation instructions or Material Safety Data Sheet.

E. Weather Conditions: Do not proceed with installation of firestop products when temperatures are in excess or below the manufacturer's recommendations.

F. Schedule installation of firestop products after completion of penetrating item installation but prior to covering or concealing of openings.

G. Coordinate this work as required with work of other trades.

1.10 SEQUENCING AND SCHEDULING

A. Pre-Installation Conference: Convene a pre-installation conference to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

B. Sequence: Perform work of this and other sections in proper sequence to prevent damage to the firestop systems and to ensure that their installation will occur prior to enclosing or concealing work.

C. Install all firestop systems after voids and joints are prepared sufficiently to accept the applicable firestop system.

D. Do not cover firestop systems until they have been properly inspected and accepted by the authority having jurisdiction.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following manufacturers:

1. Tremco
2. Bio-Fireshield
3. 3M
4. Specified Technologies Inc.
5. U.S. Gypsum Co.
6. Nelson
7. Hilti, Inc.
8. Grace Flame Safe
9. or approved equal

2.2 FIRESTOPPING, GENERAL

A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

B. Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:

1. Permanent forming/damming/backing materials including the following:

a. Semirefractory fiber (mineral wool) insulation.
b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
c. Fire-rated form board.
d. Joint fillers for joint sealants.

2. Temporary forming materials.

3. Substrate primers.

4. Collars.

5. Steel sleeves.

C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

D. Smokeseals at top of partitions shall be flexible to allow for partition deflection.

2.3 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

A. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.

B. Intumescent, Latex Sealant: Single-component, Intumescent, latex formulation.

C. Intumescent Putty: Non-hardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.

D. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum or polyethelene foil on one side.

E. Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.

F. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

G. Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

H. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, non-shrinking foam.

I. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless firestop system limits use to non-sag grade for both opening conditions.

2.4 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

1. Sealant Colors: Color of exposed joint sealants as selected by the Commissioner.

B. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.

1. Additional Movement Capability: Provide sealant with the capability to withstand 33 percent movement in both extension and compression for a total of 66 percent movement.

C. Multi-Component, Non-Sag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.

1. Additional Movement Capability: Provide sealant with the capability to withstand 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated.

D. Single-Component, Non-Sag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.

2.5 MINERAL FIBER/CERAMIC WOOL NON-COMBUSTIBLE INSULATION (FIRE SAFING)

A. Provide min. 4 pcf Thermafiber as manufactured by Thermafiber Co., min. 4 pcf FBX Safing Insulation as manufactured by Fibrex, or approved equal to suit conditions and to comply with fire resistance and firestop manufacturer's requirements.

B. Material shall be classified non-combustible per ASTM E 119.

2.6 MIXING

A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions with Installer present, for compliance with requirements for opening configuration, penetrating items, substrates, and other

conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:

1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.

2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form release agents from concrete.

B. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing seal of firestopping with substrates.

3.3 CONDITIONS REQUIRING FIRESTOPPING

A. Interior Walls and Partitions

1. Construction joints between top of fire rated walls and underside of floors above, shall be firestopped.

2. Firestop system installed shall have been tested by either UL or Omega Point, including exposure to hose stream test and including for use with steel fluted deck floor assemblies.

3. Firestop system used shall allow for deflection of floor above.

B. Penetrations

1. Penetrations include conduit, cable, wire, pipe, duct, or other elements which pass through one or both outer surfaces of a fire rated floor, wall, or partition.

2. Except for floors on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof, provide firestopping to fill such spaces in accordance with ASTM E 814.

3. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or

other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall of opening.

C. Provide firestopping to fill miscellaneous voids and openings in fire rated construction in a manner essentially the same as specified herein before.

3.4 INSTALLING THROUGH PENETRATION FIRESTOPS

A. General: Comply with the through penetrations firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for through penetration firestop systems by proven techniques to produce the following results:

1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.

2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.5 INSTALLING FIRE RESISTIVE JOINT SEALANTS

A. General: Comply with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.

C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross scctional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

D. Tool no sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.6 INSTALLING FIRESAFING INSULATION

A. Install fire safing insulation utilizing welded or screw applied galvanized steel impaling pins and retaining clips; space clips or pins 24" o.c. maximum.

B. Completely fill voids in areas where safing insulation is required. At spandrel conditions/floor edges, depth of insulation top to bottom shall be at least four (4) inches.

C. Cover top of all safing insulation with firestop sealant or spray.

3.7 FIELD QUALITY CONTROL

A. Inspecting agency employed and paid by the City of New York will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.

B. Inspecting agency will report observations promptly and in writing to Contractor, City of New York and Commissioner.

C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.

D. Where deficiencies are found, Contractor must repair or replace firestopping so that it complies with requirements.

3.8 CLEANING

A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to product firestopping complying with specified requirements.

END OF SECTION

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SECTION 079200

JOINT SEALERS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the joint sealers work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Flashing reglets and retainers.

2. Coping joints.

3. Exterior wall joints not specified to be sealed in other Sections of work.

4. Interior wall joints not specified to be sealed in other Sections of work, including caulking to fill between architectural woodwork and any wall, floor and/or ceiling imperfections.

5. Control and expansion joints in walls.

6. Joints at wall penetrations.

7. Joints between items of equipment and other construction.

8. All other joints required to be sealed to provide a positive barrier against penetration of air and moisture.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Unit Masonry – Section 04200.

H. Roofing - Division 7.

I. Firestop sealants – Section 078413.

J. Glazing sealants - Section 088000.

K. Sealant within drywall construction - Section 092900.

L. Sealant at tile work - Section 093000.

1.4 QUALITY ASSURANCE

A. Qualification of Installers: Use only personnel who are thoroughly familiar, skilled and specially trained in the techniques of sealant work, and who are completely familiar with the published recommendations of the sealant manufacturer.

B. Pre-Construction Field Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to project joint substrates according to the method in ASTM C 794 and C 1521 that is appropriate for the types of Project joints.

C. Perform testing per ASTM C 1248 on interior and exterior sealants to determine if sealants or primers will stain adjacent surfaces. No sealant work shall start until results of these tests have been submitted to the Commissioner and he has given his written approval to proceed with the work.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Shop Drawings: Submit shop drawings showing all joint conditions, indicating relation of adjacent materials, all sealant materials (sealant, bond breakers, backing, primers, etc.), and method of installation.

1. Submit joint sizing calculations certifying that movement capability of sealant is not being exceeded.

C. Samples: Submit the following:

1. Color samples of sealants.

2. Sealant bond breaker and joint backing.

D. Product Data: Submit manufacturer's technical information and installation instructions for:

1. Sealant materials, indicating that material meets standards specified herein.

2. Backing rods.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 ENVIRONMENTAL CONDITIONS

A. Temperature: Install all work of this Section when air temperature is above forty (40) degrees F. and below eighty (80) degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.

B. Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have frost.

1.8 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section, before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

C. Storage

1. Store sealant materials and equipment under conditions recommended by their manufacturer.

2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.

1.9 GUARANTEE

A. Provide a written, notarized guarantee from the manufacturer and the applicator stating that the applied sealants shall remain watertight for a period of ten (10) years.

B. Guarantee shall be in a form acceptable to the City of New York and executed by an authorized individual.

C. Guarantee shall further state that installed sealant is guaranteed against:

1. Adhesive or cohesive failure of sealant joints.

2. Crazing greater than three (3) mils in depth developing on surface of material.

3. Staining of surfaces adjacent to joints by sealants or primer by migration through building materials in contact with them.

4. Chalking, or visible color change on surface of cured sealant.

5. Increase or decrease of "Shore A" durometer hardness (5 second reading) of sealant of more than thirty (30) percent of seven (7) day value of "Shore A" durometer hardness of sealant.

D. Include in guarantee provision, agreement to repair and/or replace, sealant defects which develop during guarantee period, because of faulty labor and/or materials.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

A. Exterior Wall Sealant: Provide one (1) part non-sag sealant equal to No. 790 or 795 by Dow Corning, "Silpruf SCS 2000" or "LM SCS 2700" by G.E., "Spectrem 1" or "Spectrem 3" by Tremco, "Sonolastic 150" by Sonneborn, or approved equal, conforming to the minimum standards of ASTM C 920, Type S, Grade NS, Class 50.

B. Interior Sealant: Provide a one (1) part acrylic based sealant conforming to ASTM C 834, equal to "AC-20+ Silicone" by Pecora or equal made by Tremco, Dow Corning, or approved equal.

C. Acoustical Sealant: USG "Acoustical Sealant," "Tremco Acoustical Caulking" of Tremco Mfg. Co., "AC-20 FTR" of Pecora Corp., or approved equal.

D. Colors: Custom colors of sealants as selected by the Commissioner.

2.2 MISCELLANEOUS MATERIALS

A. Back-Up Materials: Provide back-up materials and preformed joint fillers, non-staining, non-absorbent, compatible with sealant and primer, and of a resilient nature, equal to "Sof-Rod" by Nomaco Inc. or approved equal, twenty-five (25) percent wider than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Provide back-up materials only as recommended by sealant manufacturer in writing.

B. Provide bond breakers, where required, of polyethylene tape as recommended by manufacturer of sealant.

C. Provide primers recommended by the sealant manufacturer for each material to receive sealant. Note that each exterior joint must be primed prior to sealing.

D. Provide solvent, cleaning agents and other accessory materials as recommended by the sealant manufacturer.

E. Materials shall be delivered to the job in sealed containers with manufacturer's original labels attached. Materials shall be used per manufacturer's printed instructions.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where joint sealers are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions required by this Project where more stringent installation requirements are specified herein, such requirements shall apply.

B. Sample Section of Sealant

1. During sealant installation work in exterior wall, the manufacturer of sealant shall send his representative to the site, under whose supervision a section of the wall (used as "control section") shall be completed for purposes of determining performance characteristics of sealant in joints. Commissioner shall be informed of time and place of such installation of control section.

2. Control section shall be installed according to specification given herein and shall not be considered as acceptable until written acceptance is provided by the Commissioner.

3. Accepted control section shall be standard to which all other sealant work must conform.

C. Supervision: The Contractor shall submit to the Commissioner written certification from the sealant manufacturer that the applicators have been instructed in the proper application of their materials. The Contractor shall use only skilled and experienced workmen for installation of sealant.

D. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool joint to provide the contour as indicated on the drawings.

E. Preparation and Application

1. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied film must be entirely removed.

2. Stone, masonry and concrete surfaces to receive sealant shall be cleaned where necessary by grinding, water blast cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.

   a. Do not use any acid or other material which might stain surfaces.
   b. Remove laitance by grinding or mechanical abrading.
   c. Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.

3. Clean non-porous surfaces such as metal and glass chemically. Remove protective coatings on metallic surfaces by solvent that leaves no residue and is compatible with sealant. Use solvent and wipe dry with clean, dry lint free paper towels. Do not allow solvent to air dry without wiping. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.

4. Do not seal joints until they are in compliance with drawings, or meet with the control section standard.

5. Joint Size and Sealant Size: Joints to receive sealant shall be at least 1/4" wide. In joint 1/4" to 3/8" wide, sealant shall be 1/4" deep. In joints wider than 3/8" and up to 1" wide, sealant depth shall be one half the joint width. For joints wider than 1", sealant depth shall be as recommended by the sealant manufacturer. Depth of joint is defined as distance from outside face of joint to closest point of the filler.

6. Primer: Thoroughly clean joints and apply primer to all surfaces that will receive sealant. Apply primer on clean, dry surfaces, and prior to installation of joint backing. Completely wet both inner faces of the joint with primer. Mask adjacent surfaces of joint with non-staining masking tape prior to priming.

7. Joint Backing: In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately twenty-five (25) percent compressions. Do not stretch, twist, braid, puncture, or tear joint backing. Butt joint backing at intersections.

8. Bond Breaker: Install bond breaker smoothly over joint backing so that sealant adheres only to the sides of the joint and not backing.

9. Sealant Application: Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates, completely filling joints to eliminate air pockets and voids. Mask adjacent surfaces of joint with

non-staining masking tape. Force sealant into joint in front of the tip of the "caulking gun" (not pulled after it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.

10. Tooling: Tool exposed joints to form smooth and uniform beds, with slightly concave surface conforming to joint configuration per Figure 5A in ASTM C 1193. Finished joints shall be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.

11. Replace sealant which is damaged during construction process.

END OF SECTION

SECTION 079500

EXPANSION CONTROL

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the expansion joint covers as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Floor expansion joint cover assemblies.

2. Wall expansion joint cover assemblies.

3. Ceiling expansion joint cover assemblies.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete - Section 033000.

H. Masonry work - Section 042000.

I. Roofing - Division 7.

J. Painting - Section 099000.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Submit product data for each type of expansion joint cover assembly specified, including manufacturer's product specifications, installation instructions, details of

construction relative to materials, dimensions of individual components, profiles, and finishes.

C. Submit shop drawings showing fabrication and installation of expansion joint cover assemblies, including plans, elevations, sections, details of components, joints, splices, and attachments to other units of work.

D. Submit samples for verification purposes in full size units of each type of expansion joint cover assembly indicated; within sets for each finish, color, texture, and pattern specified, showing full range of variations expected in these characteristics. Install elastomeric material for joints, samples to verify color selected.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 QUALITY ASSURANCE

A. Joint covers shall permit unrestrained movement of joint without disengagement of cover.

B. Floor joint cover plate assemblies shall be capable of supporting a 200 psf uniform load and a 300 lb. concentrated load with a deflection not to exceed 1/16".

1.7 DELIVERY, STORAGE AND HANDLING

A. Provide temporary protective cover on finished surfaces.

B. Deliver joint covers to jobsite in new, clean, unopened crates of sufficient size and strength to protect materials during transit.

C. Store components in original containers in a clean, dry location.

D. Handle components with equipment of sufficient size to preclude hazard to personnel or components.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Provide profiles and details as shown on the drawings; subject to compliance with requirements specified, acceptable manufacturers include Balco/Metalines, Watson Bowman Acme, Construction Specialties, MM Systems, or approved equal.

2.2 MATERIALS

A. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions; ASTM B 209, alloy 6061-T6, sheet and plate; aluminum to have the following finishes:

1. Interior and exterior walking surfaces shall have clear anodized (A41) finish.

2. Exterior surfaces not subject to pedestrian traffic shall have a "Kynar 500" finish conforming to NAAMM 605.2; two (2) colors shall be required, one (1) color to match metal siding and the other color to match adjacent concrete surfaces.

3. Interior surfaces not subject to pedestrian traffic shall be shop primed with rust inhibitive primer, minimum 2 mils thick, ready to receive field painted finish.

B. Stainless Steel: ASTM A 666, Type 304, No. 4 finish.

C. Protect metal surfaces to be placed in contact with cementitious materials with a protective coating.

D. Extruded Preformed Seals: Single or multi-cellular elastomeric profiles as classified under ASTM D 2000, designed with or without continuous, longitudinal, internal baffles. Formed to fit compatible frames, in color, as selected by Commissioner from manufacturer's standard colors.

E. Accessories: Manufacturer's standard anchors, fasteners, set screws, spacers, flexible moisture barrier and filler materials, drain tubes, lubricants, adhesive, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.3 EXPANSION JOINT COVER ASSEMBLIES

A. General: Provide expansion joint cover assemblies of design, basic profile, materials, and operation indicated on drawings. Provide units comparable to those indicated or required to accommodate joint size, variations in adjacent surfaces, and dynamic structural movement without material degradation or fatigue when tested according to ASTM E 1399. Furnish units in longest practical lengths to minimize number of end joints. Provide hairline mitered corners where joint changes direction or abuts other materials. Include closure materials and transition pieces, tee-joints, corners, transition pieces, curbs, cross-connections, and other accessories as required to provide continuous joint cover assemblies.

1. Special conditions shall be shop fabricated.

2. Fabricate components in largest practical lengths to minimize field splicing.

B. Moisture Barrier: Provide manufacturer's continuous, standard, flexible vinyl moisture barrier under covers at locations indicated.

PART 3 EXECUTION

3.1 PREPARATION

A. Manufacturer's Instructions: In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for phases of Work, including preparing substrate, applying materials, and protecting installed units.

B. Coordinate and furnish anchorages, setting drawings, templates, and instructions for installation of expansion joint cover assemblies to be embedded in or anchored to concrete or to have recesses formed into edges of concrete slab for later placement and grouting-in of frames.

C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary to secure expansion joint cover assemblies to in-place construction, including threaded fasteners with drilled-in expansion shields for masonry and concrete where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and provide for secure attachment of expansion joint cover assemblies.

3.2 INSTALLATION

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting into new and existing construction as required to install expansion joint covers. Install joint cover assemblies in true alignment and proper relationship to expansion joints and adjoining finished surfaces measured from established lines and levels. Allow adequate free movement of thermal expansion and contraction of metal to avoid buckling. Set floor covers at elevations to be flush. Locate wall, ceiling, roof, and soffit covers in continuous contact with adjacent surfaces. Securely attach in place with required accessories. Locate anchors at interval recommended by manufacturer, but not less than 3" from each end and not more than 24" o.c.

B. Continuity: Maintain continuity of expansion joint cover assemblies with a minimum number of end joints and align metal members mechanically using splice joints. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials (if any) to frames with adhesive or pressure sensitive tape as recommended by manufacturer.

C. Extruded Preformed Seals: Install seals complying with manufacturer's instructions and with minimum number of end joints. For straight sections provide preformed seals in continual lengths. Vulcanize or heat-weld field splice joints in preformed seal material to provide watertight joints using procedures recommended by manufacturer. Apply adhesive, epoxy, or lubricant adhesive approved by manufacturer to both frame interfaces before installing preformed seal. Seal transitions according to manufacturer's instructions.

D. Elastomeric Sealant Joint Assemblies: Seal end joints within continuous runs and joints at transitions according to manufacturer's directions to provide a watertight installation.

3.3 CLEANING AND PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's instructions.

END OF SECTION

SECTION 081113

STEEL DOORS AND FRAMES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the steel doors and frames work as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Interior and exterior hollow metal doors and frames for fire rated and unrated door openings.

2. Trimmed openings.

3. Interior hollow metal vision panels.

4. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping necessary.

5. Preparation of hollow metal doors to receive glazing where required.

6. Furnishing anchors for building into masonry and drywall.

7. Factory prime painting of work of this Section.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Unit Masonry - Section 042000.

H. Installation of doors and frames - Section 062000.

I. Metal Sound Control Door Assemblies – Section 083473.13

J. Finish hardware - Section 087100.

K. Glass and glazing - Section 088000.

L. Gypsum drywall – Section 092900.

M. Painting - Section 099000.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Include construction details, material descriptions, core descriptions, label compliance, compliance with standards referenced herein, sound and fire-resistance ratings, and finishes for each type of door and frame specified.

C. Shop Drawings: Show fabrication and installation of doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, reinforcement for surface applied hardware, dimensions of profiles and hardware preparation, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessories.

D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Drawings.

1. Coordinate glazing frames and stops with glass and glazing requirements.

E. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing custom steel doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.

C. Source Limitations: Obtain custom steel doors and frames through one source from a single manufacturer.

D. Fire-Rated Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.

1. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40" or less above the sill.

2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.

3. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 250 deg. F. (or greater if required by Code) maximum in 30 minutes of fire exposure.

E. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.

F. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.

B. Inspect doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Commissioner; otherwise, remove and replace damaged items as directed.

C. Store doors and frames under cover at building site. Conform to the requirements of ANSI A 250-11-2001 for site storage unless more stringent requirements are noted herein. Place units on minimum 4-inch high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to permit air circulation.

PART 2 PRODUCTS

2.1 FABRICATION - GENERAL

A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.

B. Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.

C. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."

D. Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.

2.2 MANUFACTURERS

A. Provide products manufactured by Steelcraft, Curries, Ceco Door Products, or approved equal meeting these specifications.

2.3 FRAMES

A. Materials

1. Frames for exterior openings shall be made of commercial grade cold-rolled steel conforming to ASTM A 1008/A, Type B not less than 14 ga., and shall have a hot dipped galvannealed coating conforming to ASTM A 924 and A 653 with A-60 coating. The zinc-alloy coating shall be a dull matte surface treated for paint adhesion.

2. Frames for interior openings shall be either commercial grade cold-rolled steel conforming to ASTM A 1008/A, Type B or commercial grade hot-rolled steel conforming to ASTM A 1011/A, Commercial Steel, Type B. Metal thickness shall be not less than sixteen (16) ga. for frames in openings 4'-0" or less in width; not less than fourteen (14) ga. for frames in openings over 4'-0" in width.

B. Design and Construction

1. All frames shall be welded units with integral trim, of the sizes and shapes shown on approved shop drawings.

2. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.

3. Jamb depths, trim, profile and backbends shall be as shown on drawings.

   a. Frames at drywall partitions shall be formed with double return backbends to prevent cutting into drywall surface.

4. Welded frames shall have corners mitered and reinforced and faces of welded frames shall be continuously back welded full depth and width of frame conforming to NAAMM Standard HMMA-820; face joints shall be hairline.

5. Minimum depth of stops shall be 5/8".

6. Frames for multiple or special openings shall have mullion and/or rail members which are closed tubular shapes having no visible seams or joints. All joints between faces of abutting members shall be securely welded and finished smooth.

   a. Mullions shall have 16 ga. internal steel stiffeners welded not less than 4" o.c.

7. Hardware Reinforcements

   a. Frames shall be mortised, reinforced, drilled and tapped at the factory for fully-templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates.

   b. Minimum thickness of hardware reinforcing plates shall be as follows:
      1). Hinge and pivot reinforcements - seven (7) ga., 1-1/4" x 10" minimum size.
      2). Strike reinforcements - twelve (12) gauge
      3). Flush bolt reinforcements - twelve (12) gauge
      4). Closer reinforcements - twelve (12) gauge
      5). Reinforcements for surface mounted hardware - twelve (12) gauge.

8. Floor Anchors

a. Provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
b. Minimum thickness of floor anchors shall be fourteen (14) gauge.

9. Jamb Anchors

a. Frames for installation in masonry walls shall be provided with adjustable jamb anchors of the wire type. Anchors shall be not less than 0.156" diameter steel wire. The number of anchors provided on each jamb shall be as follows:
   1). Frames up to 7'-6" height - three (3) anchors.
   2). Frames 7'-6" to 8'-0" height - four (4) anchors.
   3). Frames over 8'-0" height - one (1) anchor for each 2'-0" or fraction thereof in height.
b. Frames to be anchored to previously placed concrete or masonry shall be provided with minimum 3/8" concealed bolts set into expansion shields or inserts at six (6) inches from top and bottom and twenty-four (24) inches o.c. Reinforce frames at anchor locations with sixteen (16) gauge sheet steel stiffeners welded to frame at each anchor.

10. Anchors in exterior frames and in masonry walls shall be hot dip galvanized per ASTM A 153.

11. Frames for installation in masonry wall openings more than 4'-0" in width shall have an angle or channel stiffener factory welded into the head. Such stiffeners shall be not less than twelve (12) gauge steel and not longer than the opening width, and shall not be used as lintels or load bearing members.

12. Frames to be installed below polycarbonate clerestory panels that are to receive overhead concealed closers shall be provided with stiffening steel shoe fittings.

13. Dust cover boxes (or mortar guards) of not thinner than twenty-six (26) gauge steel shall be provided at all hardware mortises on frames to be set in masonry or plaster partitions.

14. Ceiling Struts: Minimum 3/8" thick x 2" wide steel.

15. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.

16. Loose glazing stops shall be of cold rolled steel, not less than twenty (20) gauge thickness, butted at corner joints and secured to the frame with countersunk cadmium-or zinc-plated screws. Interior frames may be provided with snap-on glazing stops.

17. Except on weather-stripped frames and sound control door assemblies, drill stops to receive three (3) silencers on strike jambs of single door frames and two (2) silencers on heads of double-door frames.

C. Finish: After fabrication, all tool marks and surface imperfections shall be removed, and exposed faces of all welded joints shall be dressed smooth. Frames shall then be chemically treated to insure maximum paint adhesion and shall be coated on all surfaces with one coat of rust-inhibitive baked-on alkyd primer standard with the manufacturer which is fully cured before shipment to a dry film thickness of 2.0 mils.

1. Frames set in masonry walls shall be grouted in as described in Section 042000 – Unit Masonry. These frames shall have surfaces in contact with grout shop coated with epoxy coating equal to Series 27 FC Typoxy made by Tnemec or approved equal spray applied at 4 to 6 mils, passing NFPA 101, Class A for smoke and flame spread, tested per ASTM E 84.

2.4 HOLLOW METAL DOORS

A. Materials: Doors shall be made of commercial quality, level, cold rolled steel conforming to ASTM A 1008/A, Commercial Steel, Type B and free of scale, pitting or other surface defects. Face sheets for interior doors shall be not less than eighteen (18) gauge. Face sheets for exterior doors shall be not less than sixteen (16) gauge and shall have a hot dipped galvannealed coating conforming to ASTM A 924 and A 653, A-60 coating. The zinc alloy coating shall be a dull matte surface treated for paint adhesion.

B. Design and Construction

1. All doors shall be of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4".

2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckles. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.

3. Face sheets shall be stiffened by continuous vertical formed steel sections spanning the full thickness of the interior space between door faces. These stiffeners shall be not less than twenty two (22) gauge spaced not more than six (6) inches apart and securely attached to face sheets by spot welds not more than five (5) inches o.c. Spaces between stiffeners shall be sound deadened and thermal insulated the full height of the door with an inorganic non-combustible batt type material.

4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

5. Top and bottom edges of all doors shall be closed with a continuous recessed steel channel not less than fourteen (14) gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attachment of weatherstripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.

6. Edge profiles shall be provided on both vertical edges of doors as follows:

   a. Single-acting swing doors - beveled 1/8" in two (2) inches.
   b. Double acting swing doors - rounded on 2-1/8" radius.
   c. No square edge doors permitted.

7. Hardware Reinforcements

   a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation - such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates.
   b. Minimum gauges for hardware reinforcing plates shall be as follows:
      1). Hinge and pivot reinforcement - seven (7) gauge.
      2). Reinforcement for lock face, flush bolts, concealed holders, concealed or surface mounted closers - twelve (12) gauge.
      3). Reinforcements for all other surface mounted hardware - sixteen (16) gauge.

8. Glass Moldings and Stops

   a. Where specified or scheduled, doors shall be provided with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on drawings.
   b. Fixed moldings shall be securely welded to the door on the security side.
   c. Loose stops shall be not less than twenty (20) gauge steel, with mitered corner joints, secured to the framed opening by cadmium or zinc-coated countersunk screws spaced eight (8) inches o.c. Snap-on attachments will not be permitted. Stops shall be flush with face of door.

C. Finish: After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall then be chemically treated to insure maximum paint adhesion and shall be coated, on all exposed surfaces, with manufacturer's standard rust-inhibitive alkyd primer as specified for frames which shall be fully cured before shipment.

D. Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in any direction, including in a diagonal direction.

2.5 LABELED DOORS AND FRAMES

A. Labeled doors and frames shall be provided for those openings requiring fire protection ratings as scheduled on drawings. Such doors and frames shall be labeled by Underwriters' Laboratories or other nationally recognized agency having a factory inspection service.

B. If any door or frame specified by the Commissioner to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or any other reason, the Commissioner shall be so advised before fabricating work on that item is started.

2.6 HARDWARE LOCATIONS

A. The location of hardware on doors and frames shall be as noted in "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames" of the Door Hardware Institute unless otherwise required by prevailing Handicap Codes.

2.7 CLEARANCES

A. Fabricate doors and frames to meet edge clearances as follows:

1. Jambs and Head: 1/8" plus or minus 1/16".

2. Meeting Edges, Pairs of Doors: 1/8" Plus or minus 1/16".

3. Bottom: 3/4", if no threshold.

4. Bottom: 3/8", at threshold.

B. Fire rated doors shall have clearances as required by NFPA 80.

2.8 MANUFACTURING TOLERANCES

A. Manufacturing tolerance shall be maintained within the following limits:

1. Frames for Single Door or Pair of Doors

a. Width, Measured Between Rabbets at the Head
   1). Nominal opening width +1/16", -1/32"
b. Height (total length of jamb rabbet):
   1). Nominal opening height + 3/64"
c. Cross Sectional Profile Dimensions
   1). Face: + 1/32"
   2). Stop: + 1/32"
   3). Rabbet: + 1/64"
   4). Depth: + 1/32"
   5). Throat: + 1/16". Frames overlapping walls to have throat dimension 1/8" greater than dimensioned wall thickness to accommodate irregularities in wall construction.

2. Doors

a. Width: + 3/64"
b. Height: + 3/64"
c. Thickness: + 1/16"
d. Hardware Cutout Dimensions
   1). Template dimensions +0.015", -0"
e. Hardware Location: + 1/32"

2.9 PREPARATION FOR FINISH HARDWARE

A. Prepare door and frames to receive hardware:

1. Hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.

2. Preparation includes sinkages and cut-outs for mortise and concealed hardware.

B. Provide reinforcements for both concealed and surface applied hardware:

1. Drill and tap mortise reinforcements at factory, using templates.

2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

2.10 REJECTION

A. Hollow metal frames or doors which are defective, have hardware cutouts of improper size or location, or which prevent proper installation of doors, hardware or work of other trades, shall be removed and replaced with new at no cost.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where steel doors and frames are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Refer to Section 062000 for installation procedures for all work of this Section.

END OF SECTION

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SECTION 081119

STAINLESS STEEL DOORS AND FRAMES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the stainless steel door and frame work as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Stainless steel doors and frames.

2. Preparation of doors and frames to receive finish hardware.

3. Furnishing anchors.

4. Installation of doors and frames.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete - Section 033000.

H. Unit Masonry - Section 042000.

I. Steel Doors and Frames - Section 081113.

J. Metal Sound Control Door Assemblies – Section 083473.13

K. Finish Hardware - Section 087100.

1.4 QUALITY ASSURANCE

A. Codes and Standards: In addition to complying with all pertinent codes and regulations:

1. Shop drawings, shall comply with nomenclature established in American National Standards Institute publication A123.1, latest edition, "Nomenclature for Steel Doors and Steel Door Frames."

   a. ANSI A115 "Door and Frame Preparation for Door Locks and Flush Bolts," American National Standards Institute.
   b. ANSI A123.1 "Nomenclature for Steel Doors and Steel Door Frames," American National Standards Institute.
   c. Steel doors and frames shall comply with the Specifications for Custom Hollow Metal Doors and Frames, National Association of Architectural Metal Manufacturers (NAAMM) Standard CHM 174.
   d. Builders' Hardware Manufacturers Association.

B. All stainless steel shall conform to ASTM A 666, Type 316.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the

project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.

d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).

e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Shop Drawings

1. Shop drawings shall indicate at large scale, profiles, gauges, sizes and reinforcing and anchorage devices, for securing to adjacent construction.

a. Indicate glazing frames and stops for coordination with "Glass and Glazing" section.

2. Shop drawings shall include schedules, listing the qualities of each kind and type of buck, frame, trim and door, size of doors and frames, clearances, undercuts, location and label requirements.

a. Schedule of doors and frames shall use same reference numbers for details and openings as those on the Contract Documents.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Deliver doors and frames and other work of this Section properly tagged and identified.

B. Protection

1. Deliver, store and handle all metal doors and frames in a manner to prevent damage and deterioration.

2. Provide packaging, separators, banding, spreaders, and individual wrappings as required to completely protect all metal doors and frames during transportation and storage.

3. Store doors upright, in a protected dry area, at least one (1) inch off the ground and with at least 1/4" air space between individual pieces; protect all surfaces as required.

PART 2 PRODUCTS

2.1 FABRICATION - GENERAL

A. Stainless steel doors and frames shall be rigid, neat in appearance and free from defects, warp, or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush, and invisible.

B. Unless otherwise indicated, provide countersunk flat stainless steel Phillips or Jackson heads for exposed screws and bolts.

C. Prepare stainless steel doors and frames to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."

D. Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.

2.2 MANUFACTURERS

A. Provide products manufactured by Next Door Company, Karpen Steel Custom Doors & Frames, or approved equal meeting these specifications.

2.3 STAINLESS STEEL FRAMES

A. Materials: Frames shall be stainless steel conforming to ASTM A 666, Type 316. Metal thickness shall be not less than sixteen (16) gauge for openings 4'-0" or less in width; not less than fourteen (14) gauge for frames in openings over 4'-0" in width.

B. Design and Construction

1. All frames shall be custom made welded units with integral trim, of the sizes and shapes shown on approved shop drawings.

2. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.

3. Jamb depths, trim, profile and backbends shall be as shown on drawings.

4. Corner joints shall have all contact edges closed tight, with trim faces mitered and continuously welded, and stops mitered. The use of gussets will not be permitted.

5. Minimum depth of stops shall be 5/8" with acoustic seals and gaskets.

6. Frames to be installed below polycarbonate clerestory panels that are to receive overhead concealed closers shall be provided with stiffening steel shoe fittings, minimum twelve (12) gauge.

7. Hardware Reinforcements: Frames shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accord with approved finish hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have stainless steel reinforcing plates as follows:

   a. Hinges: Seven (7) gauge, 1-1/4" x 10" minimum size.
   b. Strikes: Twelve (12) gauge.
   c. Closers: Twelve (12) gauge.
   d. Surface Mounted Hardware: Twelve (12) gauge.

8. Floor Anchors

   a. Floor anchors shall be securely welded inside each jamb for floor anchorage.
   b. Where required, provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
   c. Minimum thickness of floor anchors shall be fourteen (14) gauge stainless steel.

9. Jamb Anchors

a. Frames for installation in masonry walls shall have three (3) anchors adjustable jamb anchors of the T-strap or stirrup and strap type. Anchors shall be not less than sixteen (16) gauge stainless steel or 0.156" diameter stainless steel wire. Stirrup straps shall be not less than 2" x 10" in size, corrugated and/or perforated stainless steel.
b. Frames for installation in stud partitions shall have four (4) stainless steel anchors of suitable design, not less than eighteen (18) gauge thickness, securely welded inside each jamb.

10. Dust cover boxes (or mortar guards) of not thinner than twenty-six (26) gauge stainless steel shall be provided at all hardware mortises on frames to be set in masonry partitions.

11. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.

12. Removable glazing stops shall be of stainless steel, not less than twenty (20) gauge thickness, butted at corner joints and secured to the frame with countersunk stainless steel screws. Frames may be provided with snap-on glazing stops.

13. Frames shall be packed with unfaced acoustic insulation equal to "Acoustic Thermafiber," 3 lb. density, made by U.S. Gypsum Co. or approved equal.

C. Finish: No. 6 finish; long grain vertical pattern.

2.4 STAINLESS STEEL DOORS

A. Materials: Doors shall be made of commercial quality, level, rolled stainless steel conforming to ASTM A 666, Type 316, and free of scale, pitting or other surface defects. Face sheets for doors shall be not less than eighteen (18) gauge.

B. Design and Construction

1. All doors shall be custom made, of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4".

2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckles. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.

3. Face sheets shall be stiffened by continuous vertical formed stainless steel sections spanning the full thickness of the interior space between door faces. These stiffeners shall be not less than twenty-two (22) gauge spaced not more than six (6) inches apart and securely attached to face sheets by spot welds not more than five (5) inches o.c. Spaces between stiffeners shall be sound-deadened the full height of the door with an inorganic non-combustible batt type acoustic insulation material.

4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

5. Top and bottom edges of all doors shall be closed with a continuous recessed stainless steel channel not less than sixteen (16) gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and a flush closure at bottom for attachment of weatherstripping. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.

6. Edge profiles shall be beveled 1/8" in two (2) inches.

7. Hardware Reinforcements

   a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accordance with the approved finish hardware schedule and templates provided by the hardware supplier.
   b. Steel doors shall have the following minimum gauge reinforcing plates:
      1). Hinges: Seven (7) gauge.
      2). Lock Faces and Closers, Concealed Closers: Twelve (12) gauge.
      3). Surface Mounted Hardware: Sixteen (16) gauge, unless otherwise indicated.

C. Finish: As specified for frames.

D. Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in every direction.

E. Louvers, where indicated, shall be fabricated of 0.050" stainless steel sheet (ASTM A 240, Type 316), stationary type, closely spaced inverted "V" blade design, flush with face sheets of door, integral with and welded to door. Fifty (50) percent free area, unless indicated otherwise on drawings.

2.5 HARDWARE LOCATIONS

A. The location of finish hardware items, specified in "Finish Hardware" section shall be as indicated in "Recommended Locations for Builders Hardware" as published by the Door and Hardware Institute, unless otherwise indicated.

2.6 CLEARANCES

A. Edge clearances shall be provided as follows, unless otherwise indicated:

1. Heads and Jambs: 1/8".

2. Door Sills (where no threshold is used): 1/4" maximum above finished floor.

3. Door Sills (where threshold is used): 3/4" maximum above finished floor.

B. Finished floor is defined as the top surface of the floor.

2.7 PREPARATION FOR FINISH HARDWARE

A. Finish hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.

B. Preparation includes sinkages and cut-outs for mortise and concealed hardware.

C. Provide reinforcements for both concealed and surface applied hardware.

1. Drill and tap mortise reinforcements at factory, using templates.

2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

PART 3 EXECUTION

3.1 FRAME INSTALLATION

A. Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames."

B. Where possible, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

3.2 DOOR INSTALLATION

A. Fit hollow metal doors accurately in frames, within clearances specified herein.

B. Inspect work after installation and repair damaged items equal to new work, or remove and replace damaged items.

END OF SECTION

SECTION 083113

ACCESS DOORS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the access doors as indicated on the drawings and/or specified herein, including, but not limited to, the following:

1. Framed flush panel access doors at masonry and tile walls.

2. Watertight flush mounted floor access hatches.

3. Provide access doors and frames for access from occupied spaces to the following, where indicated or required, and as directed by the trades of Divisions 15 and 16.

a. All shutoff or balancing valves.
b. Fire dampers, as required.
c. Points of duct access.
d. Pull boxes.
e. Controls of mechanical and electrical items.
f. Masonry shafts for pipes and conduits, as required.
g. Pipe spaces, if required.
h. Inlets of fans.
i. Fusible link and splitter damper at filter bank.
j. Automatic damper and motor.
k. Equipment not otherwise accessible.
l. House Trap

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Masonry - Section 042000.

H. Drywall - Section 092900.

I. Ceramic tile - Section 093000.

J. Valves and connections - Division 22.

1.4 QUALITY ASSURANCE

A. For actual installation of the work of this Section, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the skills required.

B. Fire-Resistance Ratings: Wherever a fire-resistance classification is shown, or for construction where access doors are installed, provide required access door assembly with panel door, frame, hinge and latch from manufacturers listed in Underwriters' Laboratories, Inc. "Classified Building Materials Index" for the rating shown.

1. Provide UL label on each access panel.

2. Provide flush, key operated cylinder lock.

C. Size Variations: Obtain Commissioner's acceptance of manufacturer's standard size units which may vary slightly from sizes shown or scheduled.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

    a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
    b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
    c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
    d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
    e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Before any materials of this Section are delivered to the job site, submit complete manufacturer's literature to the Commissioner. Submit plans and schedules showing size and location of each and every access door for Commissioner's acceptance prior to installation.

C. Shop Drawings

1. Shop drawings shall indicate at large scale, profiles, gauges, sizes and reinforcing and anchorage devices, for securing to adjacent construction, indicate finish and all accessory elements.

2. Shop drawings shall include schedules, listing the qualities of each kind and type of frame, trim and door, size of doors and frames, clearances, location and label requirements.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MATERIALS AND FABRICATION

A. Provide access door assembly manufactured by Milcor Inc, or equal made by Nystrom Inc., Karp Associates, Inc. or approved equal. Assembly shall be an integral unit complete with all parts and ready for installation.

B. Fabricate units of continuous welded steel construction. Grind welds smooth and flush with adjacent surfaces. Provide attachment devices and fasteners of the type required to secure access panels to the types of supports shown.

C. Frames for Masonry and Tile Wall Only (Flush Panel Units)

1. Fabricate frame from sixteen (16) gauge steel. Provide frame with exposed flange not less than one (1) inch wide around perimeter of frame for the following construction:

a. Exposed masonry.
b. Tile finish.

2. For installation in masonry construction, provide frames with adjustable metal masonry anchors.

D. Panels: Fabricate from fourteen (14) gauge steel, with concealed spring hinges set to open to 175 degrees. Provide removable pin type hinges of the quantity required to support the access panel sizes used in the work. Finish with manufacturer's factory applied baked enamel prime coat applied over phosphate protective coating on steel.

E. Provide flush mounted floor access hatches by Kador, Acudor, Thompson Fabricating or Commissioner approved equal.

1. Provide watertight floor access door, size as indicated as scheduled.

2. Frame shall be watertight with aluminum extrusion with integral anchor flanges and include drain channel and neoprene gasket.

3. Hinges and hardware shall be stainless steel, flush with floor level.

4. Door leaf shall be diamond tread plate to withstand live load of 300 lbs/sq ft. Operation shall be assisted with stainless steel compression springs. A hold open arm shall automatically lock the door in a 90° position.

5. Provide clear, matte slip resistant coating over mill finish.

F. Locking Devices

1. For non-rated access doors, provide flush, screwdriver operated cam locks of number required to hold door in flush, smooth plane when closed.

2. For fire rated doors, provide locks as described in paragraph 1.4, B. herein.

G. Inserts and Anchorage: Furnish inserts and anchoring devices which must be built into masonry for the installation of access panels. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where access doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 COORDINATION

A. Coordinate all work with the mechanical trades to insure proper locations and in a timely manner to permit orderly progress of the total work.

B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

C. Adjust hardware and panels after installation for proper operation.

D. Remove and replace panels or frames which are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 083473

SOUND CONTROL HOLLOW METAL DOOR ASSEMBLIES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Acoustics swinging sound control hollow metal doors and frames.

B. Perimeter seals, door bottoms and astragals.

C. Hardwar, brackets, and additional items as required.

D. Thresholds.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Unit Masonry - Section 042000.

H. Installation of doors and frames - Section 062000.

I. Metal Doors and Frames – Section 081113

J. Stainless Steel Doors and Frames – Section 081119

K. Finish hardware - Section 087100.

L. Glass and glazing - Section 088000.

M. Gypsum drywall – Section 092900.

N. Painting - Section 099000.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Include construction details, material descriptions, core descriptions, label compliance, compliance with standards referenced herein, sound and fire-resistance ratings, and finishes for each type of door and frame specified.

C. Shop Drawings:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of preparations for power, signal, and control systems.

D. Door Schedule: provide a schedule of sound-control door assemblies prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with the Door Hardware Schedule.
1. Coordinate glazing frames and stops with glass and glazing requirements.

E. Samples:

1. Finishes: for each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
2. Doors: Include section of vertical-edge, top, and bottom construction: automatic door bottom or gasket; core construction; glazing; and hinge and other applied hardware reinforcement.
3. Frames: Include profile, corner joint, floor and wall anchors, and seals. Include separate section showing fixed sound panels if applicable.

F. Product Test Reports: based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of sound control assembly.

1.5 LEED PERFORMANCE CRITERIA

A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

B. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM E 1408 - Standard Test Method for Laboratory Measurement of the Sound Transmission Loss of Door Panels and Door Systems.
9. ASTM E336 - Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.
10. ASTM E 413 - Classification for Rating Sound Insulation.
11. ANSI/BHMA A156.15 - Hardware Preparation in Steel Doors and Frames.
12. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
13. ANSI/SDI 124 - Maintenance of Standard Steel Doors and Frames.
14. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
15. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
16. UL 10C (1998) - Positive Pressure Fire Tests of Door Assemblies; UL 1784 (2001) - Standard for Air Leakage Tests of Door Assemblies.

1.6 TESTING AND PERFORMANCE

A. Sound control assemblies to be identical to those tested at an independent acoustical laboratory qualified under the National Voluntary Laboratory Accreditation Program (NVLAP) by the National Institute for Science and Technology (NIST) in accordance with ASTM E1408 and ASTM E413.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing custom steel doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Pre-Installation Conference: Conduct conference in compliance with requirements in DDC General Conditions with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing sound control doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.

B. Inspect doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Commissioner; otherwise, remove and replace damaged items as directed.

C. Store doors and frames under cover at building site. Conform to the requirements of ANSI A 250-11-2001 for site storage unless more stringent requirements are noted herein. Place units on minimum 4-inch high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to permit air circulation.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install wood sound-control wood doors until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.10 COORDINATION

A. Coordinate installation of anchorages for sound control hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sound-control door assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet sound rating requirements.
b. Faulty operation of sound seals.
c. Deterioration of metals, metal finishes, and other materials beyond normal use or weathering.

B. Warranty Period for Steel and Stainless Steel Doors: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products as manufactured by one of the following:

1. Krieger Specialty Products Company.
2. Overly Door Company.
3. Pioneer Industries, Inc.
4. Security Acoustics; a division of Security Metal Products Corp.
5. Approved equal.

B. Basis of Design: Subject to compliance with requirements, provide Model 5192149, as manufactured by Overly Door Company, or approved equal.

1. Doors shall have a minimum STC rating of 51 unless otherwise indicated on Drawings.

2.2 MATERIALS

A. Stainless Steel Sheet: ASTM A 666, Type 316. Metal thickness shall be not less than sixteen (16) gauge for openings 4'-0" or less in width; not less than fourteen (14) gauge for frames in openings over 4'-0" in width.

B. Frame Anchors: ASTM A 653, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.

C. Door Hardware: Provide required door hardware including perimeter seals, door bottoms, astragals, thresholds and hardware standoff brackets required to meet the specified STC rating. Refer to Division 8 Section, "Door Hardware" for remainder of sound control door hardware.

D. Glazing: Vision panels to be designed and tested by the manufacturer to meet the specified STC rating and comply with requirements in Division 8 Section, "Glazing."

E. Grout: Comply with ASTM C 476, with a slump of not more than 4 inches as measured according to ASTM C 143.

2.3 SOUND CONTROL HOLLOW STAINLESS STEEL DOORS

A. Description: Provide flush-design sound-control doors, 1-3/4 inches thick, of seamless construction; with manufacturer's standard sound-retardant core as required to provide STC and fire rating indicated. Construct doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges. Fabricate according to ANSI/NAAMM-HMMA 865.

1. Interior Doors: Fabricate from cold-rolled steel sheet unless otherwise indicated, 0.060 inch nominal thickness, or thicker as required to achieve STC rating indicated.

    a. Core Construction: Manufacturer's standard sound control door core construction designed and tested for the specified STC rating.
        1) Fire Door Core: As required to provide fire-protection level specified

2. Loose Stops for Glazed Lites in Doors: Same material as face sheets.

3. Top and Bottom Channels: Closed with continuous channels of same material as face sheets, spot welded to face sheets not more than 6 inches o.c.

4. Hardware Reinforcement: Same material as face sheets.

2.4 SOUND CONTROL HOLLOW STAINLESS STEEL FRAMES

A. Description: Fabricate sound-control door frames with corners mitered, reinforced, and continuously welded full depth and width of frame. Fabricate according to ANSI/NAAMM-HMMA 865.

1. Material and Thickness: Minimum 14 gage (0.067-inch) thick Stainless Steel sheet.

B. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

C. Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 865 of same material as face sheets.

1. Factory mortise, reinforce, drill and tap and doors and frames for all mortise hardware as required by hardware manufacturer's template. Provide necessary reinforcement plates as required for surface mounted hardware; all drilling and tapping to be done in field by installer. Provide dust cover boxes on all frame mortises.

2. Head Reinforcement: Reinforce frames with metallic-coated steel channel or angle stiffener, 0.108-inch nominal thickness, welded to head.

D. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.064-inch nominal thickness metallic-coated steel with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.156 inch thick.

2. Floor Anchors: Floor anchors to be provided at each jamb. Formed from same material as frames, not less than 0.079-inch thick

E. Plaster Guards: Metallic-coated steel sheet, not less than 0.026 inch thick

2.5 SOUND-CONTROL HARDWARE

A. Description: Provide manufacturer's standard sound-control system, including head and jamb seals, door bottoms, cam-lift hinges, and thresholds, as required by testing to achieve STC and fire rating indicated.

1. Compression Seals: One-piece units; consisting of closed-cell sponge neoprene seal held in place by metal retainer; with retainer cover of same material as door frame; attached to door frame with concealed screws.

2. Door Bottoms: Neoprene or silicone gasket held in place by metal housing; surface mounted to room side of the door.

3. Thresholds: Flat, smooth, unfluted type as recommended by manufacturer; fabricated from aluminum.
   a. Finish: Clear anodic finish.

4. Other Hardware: Comply with requirements in Division 8 Section "Door Hardware".

2.6 FABRICATION

A. Sound-Control Steel Door Fabrication: Sound-control doors to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal.

1. Seamless Edge Construction: Fabricate doors with faces joined at vertical edges by welding; welds shall be ground, filled, and dressed to make them invisible and to provide a smooth, flush surface.

2. Glazed Lites: Factory install glazed lites according to requirements of tested assembly to achieve STC rating indicated. Provide fixed stops and moldings welded on secure side of door.

B. Sound-Control Frame Fabrication: Fabricate sound-control frames to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

1. Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated from same thickness metal as frames.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

3. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

4. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Two anchors per jamb up to 60 inches in height.
        2) Three anchors per jamb from 60 to 90 inches in height.
        3) Four anchors per jamb from 90 to 96 inches in height.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.

5. Head Reinforcement: For frames more than 48 inches wide, provide continuous head reinforcement for full width of opening, welded to back of frame at head.

6. Hardware Preparation: Factory prepare sound-control frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in "Door Hardware."

    a. Reinforce frames to receive nontemplated mortised and surface-mounted door hardware.

    b. Locate hardware as indicated, or if not indicated, according to NAAMM-HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

7. Plaster Guards: Weld guards to frame at back of hardware cutouts and glazing-stop screw and sound-control seal preparations to close off interior of openings in frames to be grouted.

C. Hardware Preparation: Factory prepare sound-control doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in "Door Hardware."

    1. Reinforce doors and frames to receive nontemplated mortised and surface-mounted door hardware.

2. Locate door and frames hardware as indicated, or if not indicated, according to NAAMM-HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

D. Tolerances: Fabricate doors and frames to tolerances indicated in ANSI/NAAMM-HMMA 865.

2.7 STAINLESS STEEL FINISHES – refer to Section 081119.

2.8 STEEL FINISHES

A. Prime Finish: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

B. Finish Coats: Refer to Division 9 Section "Painting" for materials and requirements of field applied finish coats.

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. General Contractor to verify the accuracy of dimensions given to door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation and with installation spreaders in place, adjust and securely brace sound-control door frames to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated mortised and surface-mounted door hardware.

3.3 INSTALLATION

A. General: General: Install sound control hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Sound Control Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.

   a. At fire-protection-rated openings, install frames according to NFPA 80.
   b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
   c. Install frames with removable glazing stops located on secure side of opening.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with appropriate mortar.

4. Wood or Metal Partitions: As required by the specified STC rating, and in accordance with the manufacturer's recommended instructions, coordinate installation of frames to allow for solidly filling space between frames and wood or metal partitions with light weight plaster grout.

C. Sound Control Hollow Metal Doors: Fit sound control hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

   a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
   b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
   c. Between Bottom of Door and Top of Threshold: Standard bottom clearance as required by manufacturer.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Sound-Control Seals: Where seals have been prefit and preinstalled in the factory and subsequently removed for shipping, reinstall seals and adjust according to manufacturer's written instructions.

E. Cam-Lift Hinges: Install hinges according to manufacturer's written instructions.

F. Thresholds: Set thresholds in full bed of sealant complying with requirements in Division 7 Section "Joint Sealants."

G. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with sound-control door assembly manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner

H. Install perimeter seals, door bottoms, astragals and thresholds in accordance with manufacturer's written installation instructions.

3.4 FIELD QUALITY CONTROL

A. Qualified independent testing agency to test specific sound control assembly installations as selected by the City of New York/Commissioner in accordance with ASTM E336. Installed product to perform no less than five FSTC or NIC rating points below the specified laboratory STC rating. Installations that do not meet criteria, to be adjusted and retested until compliance is obtained.

3.5 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including sound control hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from sound control hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION

SECTION 084113

ALUMINUM ENTRANCES AND STOREFRONTS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the aluminum entrances and storefronts as indicated on the drawings and/or specified herein, including the following:

1. Exterior entrance systems.

2. Exterior storefront systems.

3. Interior storefront systems.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Joint sealers - Section 079200.

H. Finish hardware - Section 087100.

I. Glass and glazing - Section 088000.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material

used. Provide certifications that materials and systems comply with specified requirements.

C. Shop Drawings: Provide large scale shop drawings for fabrication, installation and erection of all parts of work. Provide plans, elevations, and details of anchorages, connections and accessory items. Provide installation templates for work installed by others. Show interfaces and relationships to work of other trades.

D. Field Measurements: Take necessary field measurements before preparation of shop drawings and fabrication. Do not delay progress of job. If field measurements are not possible prior to fabrication, allow for field cutting and fitting.

E. Initial Selection Samples: Submit samples showing complete range of colors, textures, and finishes available for each material used.

F. Verification Samples: Submit representative samples of each material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide samples having minimum size of 144 sq. in.

G. Calculations: Provide professionally prepared calculations and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied; refer to Article 1.5, para. D for further description.

H. Test Reports: Provide certified test reports for specified tests.

1.5 QUALITY ASSURANCE

A. Source: For each material type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.

B. Installer: A firm with a minimum of three years' experience in type of work required by this Section and which is acceptable to manufacturers of primary materials.

C. Design Criteria: Drawings indicate sizes, member spacings, profiles, and dimensional requirements of work of this Section. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in the Commissioner's sole judgment, such deviations do not materially detract from the design concept or intended performances.

D. Engineering: Provide services of a licensed engineer, registered in the jurisdiction in which the Project will be built, to design and certify that work of this Section meets or exceeds performance requirements specified.

1.6 TESTS AND PERFORMANCE REQUIREMENTS

A. Manufacturer's Standard Tests: Provide manufacturer's standard test data showing compliance with specified requirements.

B. Testing and performance data applies to exterior assemblies.

C. Test Sequence: Test sequence is optional, except that air infiltration tests shall precede water resistance tests.

D. Air Infiltration Test: Test unit in accordance with ASTM E 283, as follows:

1. Static Air Pressure Difference: 6.24 psf for fixed storefront units, and 1.567 psf for doors.

2. Performance: Maximum air leakage shall not exceed the following:

a. Fixed Storefront Units: 0.06 cfm per sq. ft. of window area.
b. Door Units: 0.50 cfm per sq. ft. of single doors, 1.00 cfm per sq. ft. for doors hinged in pairs.

E. Water Leakage Test: Test fixed framing system in accordance with ASTM E 331.

1. Test Pressure: 6.24 psf.

2. Performance: No leakage as defined in test method at specified test pressure.

F. Uniform Load Deflection Test: Test units in accordance with ASTM E 330, at following static air pressure difference (Design Wind Pressure), or loads prescribed by code for this project site, whichever is greater. Apply pressure first to exterior side (positive) and then interior side (negative).

1. Design Wind Pressure: 30 pounds per square foot minimum.

2. Test Procedure: Procedure A as specified in ASTM E 330.

3. Performance: Deflection in each member measured at locations of greatest deflection shall not exceed L/175 at specified Design Wind Pressure.

G. Uniform Load Structural Test: Test units in accordance with ASTM E 330 at following static air pressure difference. Apply high pressure load first on one side and then on other side. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or activating mechanisms.

1. Static Air Pressure: Minimum 1.5 times the Design Wind Pressure.

2. Permanent Deformation in Any Member: Not to exceed 0.2% of member span.

H. Condensation Resistance Factor: Not less than 45 for fixed storefront units, and not less than 48 for doors; per AAMA 1502.7.

I. Thermal Movement: Provide storefront systems that allow for expansion and contraction of members throughout an ambient temperature range of 120 degrees F.

J. Seismic Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 9, "Earthquake Loads," whichever are more stringent.

1.7 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Store under cover and protect from weather damage.

B. Sequence deliveries to avoid delays, but minimize on-site storage.

1.9 WARRANTIES

A. Provide written warranty, signed by manufacturer, agreeing to repair or replace work that exhibits defects in materials or workmanship. "Defects" is defined to include, but not be limited to, leakage of water, abnormal aging or deterioration, abnormal deterioration or fading of finishes, and failure to perform as required. Include requirement for removal and replacement of covering and connected adjacent work.

1. Warranty Period: Three (3) years from date of Substantial Completion; except finish shall be warranted for a period of fifteen (15) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/PRODUCTS

A. Provide storefronts and entrance systems of one of the following manufacturers that meet or exceed requirements of these specifications:

1. Kawneer Company, Inc.

2. Wausau Metals Corporation.

3. EFCO.

4. Or approved equal.

B. Basis of Design Products:

1. Exterior frame system shall be equal to Series 403-1 with shear block by Efco Corporation or approved equal manufacturer listed above.

2. Interior frame system shall be equal to Series 402 with Shear Block by Efco Corporation or approved equal manufacturer listed above.

3. Doors for interior and exterior application shall be "Narrow Stile" Series D202 by Efco Corporation or approved equal manufacturer listed above.

2.2 MATERIALS AND ACCESSORIES

A. Aluminum Members: Provide 6063-T5 alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish. Comply with ASTM B 221 for extrusions, and ASTM B 209 for sheet/plate. Provide 0.125" thick extrusions for door stiles and storefront framing. Provide 0.050" thick aluminum for glazing moldings.

1. Structural aluminum shapes shall conform to ASTM B 308.

B. Fasteners: Provide non-magnetic stainless steel fasteners, warranted by manufacturer to be non-corrosive and compatible with aluminum components.

C. Concealed Flashing: Dead-soft stainless steel, 26 gauge minimum, or extruded aluminum 0.062" minimum, of an alloy and type selected by manufacturer for compatibility with other components.

D. Brackets and Reinforcements: Non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.

E. Concrete/Masonry Inserts: Cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 386.

F. Bituminous Coatings: Cold-applied asphalt mastic compounded for 30-mil thickness per coat.

G. Compression Weatherstripping: Manufacturer's standard replaceable stripping of molded neoprene or PVC gaskets complying with ASTM D 2287.

H. Sliding Weatherstripping: Manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing.

2.3 HARDWARE

A. Provide hardware units as indicated, scheduled, or required for operation of each door. Refer to Section 087100, Finish Hardware for hardware description.

2.4 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, are indicated on Drawings. Any variable dimensions are indicated,

together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.

B. Prefabrication: To greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.

1. Preglaze door and frame units to greatest extent possible, in coordination with installation and hardware requirements.

2. Do not drill and tap for surface-mounted hardware items until time of installation at project site.

3. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work in manner which prevents damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.

C. Welding: Comply with recommendations of American Welding Society to avoid discoloration; grind exposed welds smooth and restore mechanical finish.

D. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator to prevent corrosion.

E. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.

F. Fasteners: Conceal fasteners.

G. Provide EPDM/vinyl blade gasket weatherstripping in bottom exterior door rail, adjustable for contact with threshold.

H. At interior doors and other locations without weatherstripping, provide neoprene silencers on stops to prevent metal-to-metal contact.

I. Provisions shall be made in the framing for minimum edge clearance, nominal edge cover, and nominal pocket width for the thickness and type of glazing installed, and shall be in accordance with the FGMA Glazing Manual.

J. Pocket glazed framing shall provide:

	Single Glass	Insulating Glass
1. Nominal edge cover (or bite) framing only	5/16"	1/2"
2. Min. nominal edge clearance	1/8"	1/4"
3. Min. face clearance	1/8"	5/32"

2.5 STOREFRONT FRAMING

A. General: Provide inside-outside matched resilient flush glazed system with provisions for glass replacement. Shop fabricate and preassemble frame components where possible.

B. Thermal-Break Construction: Fabricate exterior aluminum storefront framing system with integrally concealed, low conductance thermal barrier, located between exterior materials and exposed interior members, in manner which eliminates direct metal-to-metal contact. Provide manufacturer's standard construction which has been in use for similar projects for at least three years.

C. For glass and glazing, refer to Section 088000.

2.6 ALUMINUM DOORS

A. Aluminum entrance doors shall be narrow stile factory-glazed aluminum doors, manufactured by same manufacturer as storefront framing.

B. Aluminum entrance doors shall be stile and rail type swing doors. Aluminum shall be extruded aluminum conforming to ASTM B 221, 0.125" thick for door stiles and 0.050" thick for glazing molding.

1. Sections shall be of sizes and profiles indicated; shall present straight, sharply defined lines and arrises; and shall be free from defects impairing strength, durability, and appearance.

2. Fasteners where exposed shall be aluminum, stainless steel, or plated steel conforming to ASTM A 164.

C. Each door shall be factory glazed set in neoprene glazing gasket, refer to Section 088000 for glass.

D. Doors shall meet the following resistance to corner racking when tested by the Dual Moment Load Test.

1. Test section shall consist of a standard top door corner assembly. Side rail section shall be 24" long and top rail section shall be 12" long.

2. Anchor top rail positively to test bench so that corner protrudes 3" beyond bench edge.

3. Anchor a lever arm positively to side rail at a point 19" from inside edge of top rail. Attach weight support pad at a point 19" from inner edge of side rail.

4. Test section shall withstand a load of 235 lbs. on the lever arm before reaching the point of failure, which shall be considered a rotation of the lever arm in excess of 45 deg.

E. Air Infiltration: (Applies only to single acting offset pivot or butt hung entrances).

1. Air infiltration shall be tested in accordance with ASTM E 283, at a pressure differential of 1.567 psf. A single 3'-0" x 7'-0" entrance door and frame shall not exceed 0.50 cfm per linear foot of perimeter crack. A pair of 6'-0" x 7'-0" entrance doors and frame shall not exceed 1.0 cfm per linear foot of perimeter crack.

F. For door hardware, refer to Section 087100.

G. Door bottom rail of exterior doors shall have an EPDM blade gasket sweep strip applied with concealed fasteners.

H. Corner construction shall consist of mechanical clip fastening, SIGMA deep penetration and fillet welds. Glazing stops shall be hook-in type with EPDM glazing gaskets.

I. The door weatherstripping on a single acting offset pivot or butt hung exterior door and frame (single or pairs) shall be thermoplastic elastomer weatherstripping on a tubular shape with a semi-rigid polymeric backing.

J. The door weatherstripping on a double acting, center pivoted door and frame (single or pairs) shall be pile cloth. The door bottom rail shall be weatherstripped with an EPDM blade gasket sweep strip applied with concealed fasteners.

K. The meeting stiles on pairs of doors shall be equipped with an adjustable astragal.

2.7 FINISH

A. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.

2. Custom color and gloss as selected by the Commissioner.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where aluminum entrances and storefronts are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install aluminum entrance doors and storefront framing in openings prepared under other Sections plumb, square, level, in exact alignment with surrounding work, with proper clearances, and securely and positively anchored to building structure, to meet performance requirements specified herein, in accordance with manufacturer's published instructions and approved submittals.

B. Use only skilled mechanics for erection, under supervision of manufacturer's representative.

C. Provide protection against galvanic action. Isolate dissimilar materials with bituminous coating or non-absorptive dielectric tape.

D. Install aluminum entrance doors, storefront frame, and finish hardware. Carefully fit and adjust doors and hardware to frames and weatherstripping. After erection check and adjust operating hardware for smooth and proper operation.

E. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Section 079200.

F. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances.

1. Variation from Plane: Limit variation from plane or location shown to 1/8" in 12 feet; 1/4" over total length.

2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16". Where surfaces meet at corners, limit offset from true alignment to 1/32".

3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8".

3.3 PROTECTION AND CLEANING OF ALUMINUM

A. Protect finished metal surfaces from damage during fabrication, shipping, storage, and erection, and from then until acceptance by City of New York.

B. Clean metal surfaces promptly after installation, exercising care to avoid damage. Remove excess sealant, dirt, and other substances. Lubricate hardware and other moving parts.

3.4 PROTECTION AND CLEANING OF GLASS

A. Replace glass that is broken, cracked or chipped prior to time of final acceptance of Project by the City of New York.

B. Clean glass surfaces promptly after installation, exercising care to avoid damage to same.

END OF SECTION

SECTION 084228

ALL GLASS DOORS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the all glass doors, as shown on the drawings, and/or specified herein, as needed for a complete and proper installation, including the following:

1. ¾" thick clear tempered glass doors.
2. 3-1/2" full top and bottom rails, stainless steel.
3. Top center pivot hinge plate, stainless steel.
4. Top plate for mounting of electric lock clad in stainless steel.
5. 1-1/4" diameter push pull bars.
6. Cylinder lock in bottom rail.
7. Recessed floor closer, center pivots, extruded aluminum saddle with removable section at closer.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Finish hardware - Section 087100.

1.4 QUALITY ASSURANCE

A. Qualifications of Installers: For actual installation of doors, use only personnel who are thoroughly trained and experienced in installation of the selected products and who are completely familiar with the requirements of this work.

1.5 PERFORMANCE REQUIREMENTS

A. Provide systems, including anchorage, capable of withstanding loads indicated without structural failure, deflection exceeding specified limit, support components transferring stresses to glazing, and glazing-to-glazing or glazing-to-support contact as determined by structural analysis.

1. Structural Loads:

a. Wind Load: 30 psf positive and 30 psf negative.

2. Deflection Normal to glazing Plane: Limited to 1/175 of clear span or 3/4" whichever is smaller.

1.6 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).

e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: For each type of product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.

C. Shop Drawings; Show details of fabrication and installation, including the following:

1. Plans, elevations, and sections.

2. Details of fittings.

3. Hardware quantities, locations, and installation requirements.

4. Anchorages and reinforcement.

5. Glazing details.

D. Samples for Verification: Of size indicated below and of same thickness and material indicated for Work. Show the full range of color and texture variations expected.

1. Metal Finishes: 6-inch long sections of patch fittings, rails, and other items.

2. Glass: 6 inches square showing exposed-edge finish.

1.7 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.8 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.9 PROJECT CONDITIONS

A. Field Measurements: Verify opening dimensions of all-glass entrances by field measurements before fabrication and indicate measurements on Shop Drawings.

1.10 WARRANTY

A. Submit a written warranty executed by the manufacturer agreeing to repair or replace components of all-glass entrances that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures.

2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

3. Failure of operating components to function normally.

B. Warranty Period: 2 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide all glass doors manufactured by C.R. Laurence (basis of design) or equivalent product of Blumcraft, Virginia Glass Products Corp., or approved equal.

2.2 MATERIALS

A. Clear Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), Class 1 (clear) requirements. Provide products of thickness indicated that have been tested for surface and edge compression according

to ASTM C 1048 and for impact strength according to CPSC 16 CFR, Part 1201 for Category II materials.

1. Thickness: 3/4 inch.

2. Exposed Edges: Flat polished.

3. Corner Edges: Mitered.

B. Stainless Steel: ASTM A 666, Type 302 or Type 304; No. 4 finish.

2.3 COMPONENTS

A. Fittings: Provide fittings and accessories for all-glass entrances of configurations shown on drawings fabricated of stainless steel, minimum 12 ga.

B. Anchors and Fastenings: Manufacturer's standard concealed anchors and fastening.

C. Weather Stripping: Manufacturer's standard sweep-type weather stripping.

2.4 HARDWARE

A. General: Heavy-duty hardware units indicated in sizes, numbers, and type recommended by manufacturer for all-glass entrances indicated. For exposed parts, match fitting metal and finish.

B. Closers: Center-hung, concealed floor closers complying with ANSI/BHMA A156.4, Grade 1 or Grade 2 requirements, including cases, bottom arms, top pivots, plates and accessories required for a complete installation, and as follows:

1. Swing: Single acting.

2. Hold Open: Selective.

3. Positive Dead Stop: Coordinated with hold-open angle.

4. Delayed-Action Closing: Comply with requirements of authorities having jurisdiction of the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," whichever are more stringent.

a. Opening Force: 5 lbf.

C. Push-Pull: 1-1/4" diameter stainless steel, as shown on drawings.

D. Lockset: Bottom rail dead bolt, dead bolt operated by key outside and inside engaging cutout in threshold or floor plate.

1. Lock cylinder furnished by Section 087100.

E. Make provisions for and coordinate with installation requirements for electro/magnetic lock and door release at door head as specified in Section 087100.

F. Threshold: Manufacturer's standard threshold with cutouts coordinated for operating hardware, with anchors and jamb clips. not more than 1/2 inch high with beveled edges

providing a floor-level change with a slope of not more than 1:2, and fabricated of stainless steel.

2.5 FABRICATION

A. General: Fabricate all-glass entrance components in sizes, profiles, and configurations indicated.

1. Provide holes and cutouts in glass to receive hardware, fittings, rails, and accessories before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.

2. Fully temper glass using horizontal roller hearth process.

3. Factory assemble components and factory install hardware to greatest extent possible.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where all glass doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install all-glass entrances and associated components according to manufacturer's written instructions; coordinate installation with structural glass wall fabricator.

B. Set units level and plumb.

C. Maintain uniform clearances between adjacent components.

D. Lubricate hardware and other moving parts according to manufacturer's written instructions.

E. Set, seal, and grout floor closer cases as required by hardware and substrate.

3.3 ADJUSTING AND CLEANING

A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer that ensure all-glass entrances are without damage or deterioration.

END OF SECTION

SECTION 087100

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes furnishing and installation of door hardware for doors specified in "Hardware Sets" and required by actual conditions. Including screws, bolts, expansion shields, electrified door hardware, and other devices for proper application of hardware.

B. Where items of hardware are not specified and are required for intended service, such omission, error or other discrepancy shall be submitted to Commissioner.

C. Products supplied but not installed under this Section:
   1. Hardware for aluminum doors will be furnished under this Section, but installed under Division 8-Entrances and Storefronts.
   2. Final replacement of cylinder cores to be installed by City of New York.

D. Related Divisions:
   1. Division 6 Section Finish Carpentry
   2. Division 8 Section Steel Doors and Frames
   3. Division 8 Section Stainless Steel Doors and Frames
   4. Division 8 Section Sound Control Hollow Metal Door Assemblies
   5. Division 8 Section Aluminum Entrances and Storefronts
   6. Division 8 Section All Glass Doors

1.2 REFERENCES

A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI):
   1. ANSI/BHMA A156.1 Butts & Hinges (2006)
   2. ANSI/BHMA A156.2 Bored & Preassembled Locks & Latches (2003)
   3. ANSI/BHMA A156.4 Door Controls – Closers (2000)
   4. ANSI/BHMA A156.6 Architectural Door Trim (2005)
   5. ANSI/BHMA A156.7 Template Hinge Dimensions (2003)
   6. ANSI/BHMA A156.8 Door Controls – Overhead Stops and Holders (2005)
   7. ANSI/BHMA A156.16 Auxiliary Hardware (2002)
   8. ANSI/BHMA A156.18 Materials & Finishes (2006)
   9. ANSI/BHMA A156.21 Thresholds (2006)
   10. ANSI/BHMA A156.22 Door Gasketing Systems (2005)
   11. ANSI/BHMA A156.28 Keying Systems (2008)
   12. ANSI/BHMA A250.13 Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies

B. International Code Council/American National Standards Institute (ICC/ANSI):
   1. ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities (2003).

C. Underwriters Laboratories, Inc. (UL):
   1. UL 10C Positive Pressure Fire Test of Door Assemblies
   2. UL 1784 Air Leakage Test of Door Assemblies

D. Door and Hardware Institute (DHI):
   1. DHI Publication – Keying Systems and Nomenclature
   2. DHI Publication – Abbreviations and Symbols
   3. DHI Publication – Installation Guide for Doors and Hardware
   4. DHI Publication – Sequence and Format of Hardware Schedule

E. National Fire Protection Agency (NFPA)
   1. NFPA 70 National Electrical Code (2011)
   2. NFPA 80 Standard for Fire Doors and Other Opening Protectives (2010)
   3. NFPA 101 Life Safety Code (2009)
   4. NFPA 105 Standard for the Installation of Smoke Door Assemblies (2010)

F. Building Codes
   1. 2008 NYC Building Code
   2. Local Building Code

1.3 SUBMITTALS

A. Submit in accordance with Conditions of the Contract and Division 1 Administrative Requirements.

B. Shop Drawings:
   1. Hardware schedule shall be organized in vertical format illustrated in DHI Publications Sequence and Formatting for the Hardware Schedule. Include abbreviations and symbols page according to DHI Publications Abbreviations and Symbols. Complete nomenclature of items required for each door opening as indicated.

C. Submit manufacturer's catalog sheet on design, grade and function of items listed in hardware schedule. Identify specific hardware item per sheet, provide index, and cover sheet.

D. Coordination:
   1. Distribute door hardware templates to related divisions within 14 calendar days of approved hardware schedule.

E. Closeout Submittals: Submit to City of New York in a three ring binder.
   1. Warranties.
   2. Maintenance and operating manual.
   3. Maintenance service agreement.
   4. Record documents.
   5. Copy of approved hardware schedule.
   6. Copy of approved keying schedule with bitting list.
   7. Hardware supplier name, phone number and fax.

1.4 QUALITY ASSURANCE

A. Door hardware shall conform to ICC/ANSI A117.1.

B. Fire Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C, unless otherwise indicated.

C. Smoke and Draft Control Door Assemblies: Where smoke and draft control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

D. Door hardware shall be certified to ANSI/BHMA standards as noted, participate and be listed in BHMA Certified Products Directory.

E. Pre-installation Meeting: Comply with requirements in Division 1 Section "Project Meetings."
   1. Convene meeting seven calendar days before installation. Participants required to attend: Contractor, installer, material supplier, manufacturer representatives.
   2. Include in conference decisions regarding proper installation methods and procedures for receiving and handling hardware.
   3. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

F. Installer Qualifications: Specialized in performing installation of this Section and shall have 3 years minimum documented experience.

G. Hardware listed in 3.07- Hardware Schedule is intended to establish a type and grade.

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide a clean, dry and secure room for hardware delivered to Project but not yet installed.

B. Furnish hardware with each unit marked and numbered in accordance with approved finish hardware schedule. Include door and item number for each type of hardware.

C. Pack each item complete with necessary parts and fasteners in manufacturer's original packaging.

D. Deliver permanent keys, and related accessories directly to City of New York via registered mail or overnight package service. Instructions for delivery to City of New York shall be established at "Keying Conference."

E. Waste Management and Disposal

   1. Separate waste materials for reuse or recycling in accordance with Division 1- Section 01300 Administration Requirements, Waste Management and Disposal.

1.6 WARRANTY

A. General Warranty: City of New York may have under provisions of the Contract Documents and shall be an addition and run concurrent with other warranties made by Contractor under requirements of the Contract documents.

B. Special Warranty: Warranties specified in this article shall not deprive City of New York of other rights. Contractor, hardware supplier, and hardware installer shall be responsible for servicing hardware and keying related problems.
   1. Ten years for manual door closers.
   2. Five years for mortise, auxiliary and bored locks. Two years for electromechanical door hardware.
   3. Five years for exit devices.

C. Products judged defective during warranty period shall be replaced or repaired in accordance with manufacturer's warranty at no cost to City of New York. There is no warranty against defects due to improper installation, abuse and failure to exercise normal maintenance.

PART 2 PRODUCTS

2.1 HINGES

A. Hinges shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Products to be certified by the following:
   1. Hinges: ANSI/BHMA A156.1
   2. Template Hinge Dimensions: ANSI/BHMA A156.7
   3. Self Closing Hinges: ANSI/BHMA A156.26

C. Butt Hinges:
   1. Hinge weight and size unless otherwise indicated in hardware sets:
      a. Doors up to 36" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .134" and a minimum of 4-1/2" in height.
      b. Doors from 36" wide up to 42" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .145" and a minimum of 5" in height.
      c. For doors from 42" wide up to 48" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .180" and a minimum of 5" in height.
      d. Doors greater than 1-3/4" thick provide hinges with a minimum thickness of .180" and a minimum of 5" in height.
      e. Width of hinge is to be minimum required to clear surrounding trim.

   2. Base material unless otherwise indicated in hardware sets:
      a. Exterior Doors: 304 Stainless Steel, Brass or Bronze material.
      b. Interior Doors: Steel material.
      c. Fire Rated Doors: Steel or 304 Stainless Steel materials.

   3. Quantity of hinges per door:
      a. Doors up to 60"in height shall have 2 hinges.
      b. Doors 60" up to 90" in height shall have 3 hinges.
      c. Doors 90" up to 120" in height shall have 4 hinges.

d. Doors over 120" in height add 1 additional hinge per each additional 30" in height.
e. Dutch doors shall have 4 hinges.

4. Hinge design and options unless otherwise indicated in hardware sets:
   a. Hinges are to be of a square corner five-knuckle design, flat button tips and have ball bearings unless otherwise indicated in hardware sets.
   b. Out-swinging exterior and out-swinging access controlled doors shall have non-removable pins (NRP) to prevent removal of pin while door is in closed position.
   c. When full width of opening is required, use hinges that are designed to swing door completely from opening when door is opened to 95 degrees.
   d. Provide mortar boxes for frames that require any electrically modified hinges if not an integral part of frame.
   e. When shims are necessary to correct frame or door irregularities, provide metal shims only.

D. Acceptable Manufactures:

1. Standard Weight Brass/Stainless
   a. Hager Companies: BB1191
   b. Bommer Industries: BB5002
   c. McKinney: TA2314
2. Double Acting Spring Hinges
   a. Hager Companies: 1303
   b. Bommer: 3029
   c. McKinney

E. Continuous Geared Hinges:
1. Hinge weight and size requirements unless otherwise indicated in hardware sets:
   a. Choose proper weight of hinge according to manufacturer's recommendations taking into consideration weight of door, weight of finish hardware applied to door, location and frequency of usage.
   b. Size of hinge to be 1" less door height.

2. Base material: Anodized aluminum manufactured from 6063-T6 material, unexposed working metal surfaces shall be coated with TFE dry lubricant

3. Bearings:
   a. Vertical loads shall be carried on Lubriloy RL bearings for non Fire Rated doors.
   b. Standard weight hinges shall have a minimum spacing between bearings of 5-1/8". Typical door from 80" to 84" in height to have a minimum of 16 bearings.
   c. Heavy Weight hinges shall have a minimum spacing between bearings of 2-9/16". Typical door from 80" to 84" in height to have a minimum of 32 bearings.

4. Hinge Design and Options:
   a. Electric Through Wire (ETW) shall have appropriate number of wires to transfer power through door frame to door for proper connection of finish hardware. Provide ETW in a form that can be removed for connection, servicing without removing entire hinge from door and frame, and certified to handle an amperage rating of 3.5AMPS/continuous duty with 16.0AMPS/intermittent duty.
   b. When full width of opening is required, use hinges that are designed to swing door completely from opening when door is opened to 95 degrees.

c. Fire rated hinges shall carry UL certification, up to and including 90-minute applications for wood doors and up to 3-hour applications for metal doors.

F. Acceptable Manufactures:
1. Heavy Duty Concealed
   a. Hager Companies: 780-224HD
   b. Select: SL-24HD
   c. Pemko: FMHD

2.2 FLUSH BOLTS

A. Labeled openings: Provide automatic or constant latching flush bolts per hardware schedule for inactive leaf of pairs of doors. Provide dust proof strikes for bottom bolt.

B. Non-Labeled openings: Provide two flush bolts for inactive leaf of pairs of doors per hardware schedule. Top bolt shall not be more than 78" centerline from floor. Provide dust proof strike for bottom bolt.

C. Acceptable Manufactures:

Hager Companies	282D	280X
Rockwood	555	570
Trimco	3917	3911

2.3 LOCKS AND LATCHES

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty.
B. Standards: Product to be certified and listed by following:
1. ANSI/BHMA A156.2 Series 4000 Certified to Grade 1.
2. ANSI/BHMA A250.13 Certified for a minimum design load of 1150lbf (100psf) for single out swinging doors measuring 36" in width and 84" in height and a minimum design load of 1150lbf (70psf) for out swinging single doors measuring 48" in width and 84" in height.
3. UL/cUL Labeled and listed for functions up to 3 hours for single doors up to 48" in width and up to 96" in height.
4. UL10C/UBC 7-2 Positive Pressure Rated.
5. ICC/ANSI A117.1.

C. Lock and latch function numbers and descriptions of manufactures series as listed in hardware sets.

D. Material and Design:
1. Lock and Latch chassis to be Zinc dichromate for corrosion resistance.
2. Keyed functions to be of a freewheeling design to help resists against vandalism.
3. Non-handed, field reversible.
4. Thru-bolt mounting with no exposed screws.
5. Levers shall be Zinc cast and plated to match finish designation in hardware sets.
6. Roses shall be of solid Brass or Stainless Steel material.

E. Latch and Strike:

1. Stainless Steel latch bolt with minimum of ½" throw and deadlocking for keyed and exterior functions. Standard backset to be 2-3/4" and faceplate shall be adjustable to accommodate a square edge door or a standard 1/8" beveled edge door.
2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4" x 4-7/8" with proper lip length to protect surrounding trim.

F. Acceptable Manufacturers:
1. Hager Companies: 3400 Series.
2. Schlage: ND Series.
3. Sargent: 10 Line.

2.4 EXIT DEVICES

A. Shall be touch pad type, finish to match balance of door hardware. Exit Devices shall be of one manufacturer as listed for continuity of design and consideration of warranty.

1. Standards: Manufacturer to be certified by the following:
2. Exit Devices: ANSI/BHMA A156.3 Grade 1
3. Exit Devices: ANSI/BHMA A250.13 Severe Windstorm Resistant Componant
4. UL labeled panic exit hardware.
5. UL labeled fire exit hardware.

B. Touch pad shall extend a minimum of one half-door width. Freewheeling lever design shall match design of locks levers. Exit device to mount flush with door.

C. Components:
1. Covers and end caps shall be brass, bronze, or stainless steel.
2. Chassis shall be aluminum.

D. Lock and Latch Functions: Function numbers and descriptions of manufacturer's series and lever styles indicated in door hardware sets.

E. Fasteners:
1. Wood and machine screws and thru-bolts.

F. Acceptable Manufactures:
1. Wide Stile Exit Device
   a. Hager Companies: 4500 Series
   b. Von Duprin: 99 Series
   c. Sargent: 80 Series

2. Narrow Stile Exit Device
   a. Hager Companies: 4600 Series
   b. Detex: 40 Series
   c. Adams Rite: 8800 Series

G. Electric Latch Retraction
1. Continuous duty solenoids retract the latch bolt for momentary or maintained periods of time.
2. 24 VDC.

H. Power Supply for Electric Latch Retraction:

1. Provides power for up to two Electric Latch Retractions exit devices. Coordinate with Section 13200 and Section 16000 for junction boxes and conduit placement.
2. Standards: Products to be certified by the following:
3. U.L. Listed
4. Acceptable Manufacturers:
   a. Hager Companies: 2901
   b. Detex: 81-800
   c. Adams Rite: PS-LR

2.5 CYLINDERS AND KEYING

A. Cylinders shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards:
   1. DHI Handbook "Keying systems and nomenclature" (1989)

C. Cylinders:
   1. Manufacturer's standard tumbler type, six-pin.
   2. Shall be furnished with cams/tailpieces as required for locking device that is being furnished for project.

D. Keying:
   1. Contact City of New York with representative from hardware supplier to establish a keying conference. Verify keyway, visual key identification, number of master keys and keys per lock. Provide keying system per City of New Yorks instructions.
   2. Copy of City of New Yorks approved keying schedule shall be submitted to City of New York and Commissioner with documentation of which keying conference was held and City of New Yorks sign-off.
   3. Provide a bitting list to City of New York of combinations as established, and expand to twenty five percent for future use or as directed by City of New York.
   4. Key into City of New York's existing keying system if applicable.
   5. Keys to be shipped to City of New York's representative, individually tag per keying conference.

E. Acceptable manufactures:
   1. Hager Companies
   2. Schlage
   3. Sargent

2.6 PUSH PLATES AND PULL PLATES

A. Push plates: .050" thick, square corner and beveled edges with counter sunk screw holes. Width and height as stated in Hardware schedule.

B. Acceptable Manufactures:
   1. Hager Companies: 30S
   2. Rockwood: 70
   3. Trimco: 1001

C. Round Offset Pull: 1" round bar stock with 2 ½" clearance from face of door. Offset to be 3", 90-degree standard.

D. Acceptable Manufacturers:
   1. Hager Companies: H12L
   2. Rockwood: BF158
   3. Trimco: 1191E-4

2.7 CLOSERS

A. Shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendations for size of closer, depending on width of door, frequency of use, atmospheric pressure, ADAAG requirements, and fire rating.

B. Standards: Manufacturer to be certified by the following:
   1. Closers ANSI/BHMA A156.4 Grade 1
   2. ADAAG
   3. ICC/ANSI A117.1
   4. UL/cUL Listed up to 3 hours
   5. UL10C Positive Pressure Rated

C. Provide aluminum non-handed bodies with full plastic covers. Closer shall have separate staked adjustable valve screws for latch speed, sweep speed, and backcheck. Provide Tri-Pack arms and brackets for regular arm, top jamb, and parallel arm mounting for each closer.

D. Components:
   1. Double heat-treated steel, tempered springs.
   2. Precision machined, heat-treated steel piston.
   3. Triple heat-treated steel spindle.
   4. Full rack and pinion operation.

E. Mounting:
   1. Out swing doors shall have surface parallel arm mount closers except where noted on hardware schedule.
   2. In swing doors shall have surface regular arm mount closers except where noted on hardware schedule.
   3. Provide brackets and shoe supports for aluminum doors and frames to mount fifth screw.
   4. Furnish drop plates where top rail conditions on door do not allow for mounting of closer and where backside of closer is exposed through glass.

F. Size closers in compliance with requirements for accessibility (ADDAG). Comply with following maximum opening force requirements.
   1. Interior hinged openings: 5.0 lbs.
   2. Exterior hinged openings: 8.5 lbs.
   3. Fire Rated Openings: Minimum opening force allowable by authority having jurisdiction.

G. Fasteners: Provide self-drilling and tapping wood and machine screws and sex nuts and bolts for each closer.

H. Acceptable manufactures:

Hager	5200
Norton	8000
Yale	3000

2.8 CONCEALED CLOSERS

A. Shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendations for size of closer, depending on width of door, frequency of use, atmospheric pressure, ADAAG requirements, and fire rating.

B. Standards: Manufacturer to be certified by the following:
   1. Closers ANSI/BHMA A156.4 Grade 1

C. Acceptable manufacturers:
   1. Rixson:
   2. Sargent:
   3. LCN:

2.9 PROTECTIVE TRIM

A. For single doors, size two inches less door width (LDW) on push side of door, and one inch less on pull side of door. For pairs of doors, size one inch less door width (LDW) on push side of door, and ½ inch on pull side of door.
   1. Kickplates 8" high or sized to door bottom rail height
   2. Mop Plates 4" high.

B. Standards: Manufacturer to be certified by the following:

   1. Architectural Door Trim: ANSI/BHMA A156.6
   2. UL

C. Kick plates, and mop plates shall be 0.050" thick stainless steel, beveled four edges, and countersunk holes.

D. Fasteners: Supply #6 x 5/8" oval head screws, unless otherwise noted.

E. Acceptable Manufactures:
   1. Hager Companies: 194S
   2. Rockwood: K1050 x B4E
   3. Burns

2.10 STOPS AND HOLDERS

A. Wall Stops: Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Provide wall stops when possible. Door stops and holders mounted in concrete floor or masonry walls shall have stainless steel machine screws and lead expansion shields.

   1. Convex
      a. Hager Companies: 232W
      b. Rockwood: 406

c. Burns: 570

2. Wall Stop
   a. Hager Companies: 255W
   b. Rockwood: 445
   c. Burns: 530

B. Overhead stops and holders: Provide overhead stop and holders for doors that open against equipment, casework sidelights and other objects that would make wall stops/holders and floor stops/holders inappropriate. Provide sex bolt attachments for mineral core wood door applications.

1. Heavy Duty Surface
   a. Hager: 7000 SUR Series
   b. Glynn Johnson: 90 Series
   c. Rixson: 9 Series

2. Heavy Duty Concealed
   a. Hager: 7000 CON
   b. Glynn Johnson: 100 Series
   c. Rixson: 1Series

C. Standards: Manufacturer to be certified by the following:
   1. Stops and Bumpers: ANSI/BHMA A156.8
   2. Overhead Stops and Holders: ANSI/BHMA A156.8

2.11 DOOR GASKETING AND WEATHERSTRIP

A. Provide continuous weatherstrip, gasketing on exterior doors and provide smoke, light, or sound gasketing where indicated on hardware schedule. Provide non-corrosive fasteners for exterior applications.
   1. Perimeter gasketing: Apply to head and jamb, forming seal between door and frame.
   2. Meeting stile gasketing: Fasten to meeting stiles, forming seal when doors are in closed position.
   3. Door bottoms: Apply to bottom of door, forming seal with threshold or floor when door is in closed position.
   4. Sound Gasketing: Cutting or notching for stop mounted hardware not permitted.
   5. Drip Guard: Apply to exterior face of frame header. Lip length to extend 4" beyond width of door.

B. Standards: Manufacturer to be certified by the following:
   1. Door Gasketing and Edge Seal Systems: ANSI/BHMA A156.22

C. Smoke-Labeled Gasketing: Comply with NFPA 105 listed, labeled, and acceptable to authorities having jurisdiction, for smoke control indicated.
   1. Provide smoke labeled gasketing on 20 minute rated doors and on smoke rated doors.

D. Fire-Rated Gasketing: Comply with NFPA 80 listed, labeled, and acceptable to Authorities Having Jurisdiction, for fire ratings indicated.

E. Comply with UBC 7-2 and UL10C positive pressure where frame applied intumescent seals are required.

F. Acceptable Manufactures:
   1. Perimeter Gasketing:
      a. Hager Companies: 721S/881S
      b. National Guard: 5020/700E
      c. Pemko: 290

   2. Door Bottoms:
      a. Hager Companies: 750S
      b. National Guard: 200
      c. Pemko: 315
   3. Drip Guard
      a. Hager Companies: 810S
      b. National Guard: 16
      c. Pemko: 346

   4. Sound Seal
      a. Hager Companies: 864S
      b. National Guard: 107
      c. Pemko: 379

   5. Automatic Door Bottoms:
      a. Hager Companies: 740S
      b. National Guard: 222
      c. Pemko: 4131

2.12 THRESHOLDS

A. Secured with lead expansion shields and stainless steel machine screws. Notched in field to fit frame by hardware installer. Refer to Drawings for special details.

B. Standards: Manufacturer to be certified by the following:
   1. Thresholds: ANSI/BHMA A156.21
   2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

C. Acceptable Manufactures:
   1. Hager Companies: 413S
   2. National Guard: 513
   3. Pemko:271

2.13 SILENCERS

A. Where smoke, light, or weather seal are not required, provide three silencers per single door frame, two per double door frame and four per Dutch door frame.

B. Acceptable Manufactures:
   1. Hager Companies: 307D
   2. Rockwood: 608
   3. Trimco: 1229A

2.14 KEY CABINET

A. Provide key cabinet by Lund Equipment, Telkee Incorporated, or Key Control.

B. Key control system:
   1. Include two sets of key tags, hooks, labels, and envelopes.
   2. Contain system in metal cabinet with baked enamel finish, surface mounted to wall.
   3. Capacity shall be able to hold actual quantities of keys, plus 25 percent.
   4. Provide tools, instruction sheets and accessories required to complete installation.

2.15 MISCELLANEOUS

A. Desk Switch
   1. Acceptable Manufacturers:
      a. Rutherford Controls Inc.: 909S
      b. Detex: 9B2048-3
      c. Von Duprin

B. Door Bell
   1. Acceptable Manufacturers:
      a. Nutone: 1K15WH
      b. Entryview
      c. Smithgear

2.16 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if within 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 range of approved Samples.

B. Comply with base material and finish requirements indicated by BHMA designations in hardware schedule.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install hardware per manufacturer's instructions and in compliance with:

1. NFPA 80.
2. NFPA 105.
3. ICC/ANSI A117.1.
4. ANSI/BHMA A115.
5. UL10C/UBC7-2
6. Local building code.
7. Approved shop drawings.
8. Approved finish hardware schedule.

B. Do not install surface mounted items until finishes have been completed on substrates involved. Set unit level, plumb and true to line location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

3.3 FIELD QUALITY CONTROL

A. Material supplier to schedule final walk through to inspect hardware installation ten business days before final acceptance of City of New York. Material supplier shall provide a written report detailing discrepancies of each opening to General Contractor within seven calendar days of walk through.

3.4 ADJUSTMENT, CLEANING AND DEMONSTRATING

A. Adjustment: Adjust and check each opening to ensure proper operation of each item of finish hardware. Replace items that cannot be adjusted to operate freely and smoothly or as intended for application at no cost to City of New York.

B. Cleaning: Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no cost to City of New York.

C. Demonstration: Conduct a training class for building maintenance personnel demonstrating the adjustment, operation of mechanical and electrical hardware. Special tools for finished hardware to be turned over and explained usage at this meeting.

3.5 PROTECTION

A. Leave manufacturer's protective film intact and provide proper protection for all other finish hardware items that do not have protective material from the manufacture until City of New York accepts Project as complete.

3.6 HARDWARE SETS

A. The following schedule of hardware sets shall be considered a guide and Basis of Design. Furnish door hardware to meet required codes. Refer to previous sections for alternate manufacturers.

3.7 HARDWARE SCHEDULE

HARDWARE SET 1

Door Numbers: 1, 2 Exterior/Vestibule
Each opening to receive:

1 ea	Cylinder	Series 3900	US26D	HAG
	Remainder of hardware by glass door manufacturer.			

HARDWARE SET 2

Door Numbers: 21 Exterior, 35 Exterior/Feline
Each opening to receive:

1 ea	Continuous Hinge	780-224HD	CLR	HAG
1 ea	Exit Device	4600 x RIM	US32D	HAG
1 ea	Trim	46NL-OP	US26D	HAG
1 ea	Rim Cylinder	3901	US26D	HAG
1 ea	Mortise Cylinder	3902 (Cylinder Dogging)	US26D	HAG
1 ea	Pull	H12L	US32D	HAG
1 ea	Closer	5200 x HDCS	ALM	HAG
1 set	Mounting Brackets	5923 x 5913	ALM	HAG
1 ea	Threshold	438S	MIL	HAG
	Remainder of hardware by aluminum door manufacturer.			

HARDWARE SET 3

Door Numbers: 20 Exterior/Intake
Each opening to receive:

1 ea	Continuous Hinge	780-224HD x RETW	CLR	HAG
1 ea	Exit Device	4600 x RIM x ELR	US32D	HAG
1 ea	Trim	46NL-OP	US26D	HAG
1 ea	Rim Cylinder	3901	US26D	HAG
1 ea	Pull	H12L	US32D	HAG
1 ea	Closer	5200 x HDCS	ALM	HAG
1 set	Mounting Brackets	5923 x 5913	ALM	HAG
1 ea	Threshold	438S	MIL	HAG
1 ea	Door Bell & Intercom	Provided by City of New York/ Contractor Installed		
1 ea	Desk Mount Switch	909S		RCI
1 ea	Power Supply	2901 (Exit Device Latch Retraction)		HAG
	Coordinate with Electrical Contractor, Security Contractor, and Fire Alarm Consultant.			
	Remainder of hardware by aluminum door manufacturer.			

Description of operation:

1. Door is normally closed and locked.
2. Pushing doorbell on exterior and switch depressed at reception desk will permit entry or by key override.
3. In the event of power failure or fire alarm exterior of doors will remain locked.
4. Free egress at all times.

HARDWARE SET 4

Door Numbers:
Each opening to receive:

Not Used

HARDWARE SET 5

Door Numbers: 26 Exterior/Storage
Each opening to receive:

6 ea	Hinges	BB1191 4.5" x 4.5" NRP	US32D	
2 ea	Flush Bolts	282D	US26D	
1 ea	Dust Proof Strike	280X	US26D	
1 ea	Storeroom Lock	3480 x WTN	US26D	
1 ea	Closer	5200 x HDCS	ALM	
1 ea	Overhead Stop	7016 x SZ1 x SUR Series (Inactive Leaf)	US32D	
1 set	Weatherstrip	881SN	MIL	
1 ea	Threshold	413S	MIL	
2 ea	Door Bottoms	750SN	CLR	

Astragal by door manufacturer.

HARDWARE SET 6

Door Numbers: #6 Electrical, #37 Mechanical
Each opening to receive:

3 ea	Hinges	BB1191 4.5" x 4.5"	US32D	HAG
1 ea	Exit Device	4500 x RIM x F	US32D	HAG
1 ea	Trim	45NL x WTN	US26D	HAG
1 ea	Rim Cylinder	3901	US26D	HAG
1 ea	Closer	5200	ALM	HAG
1 ea	Wall Stop	255W	US32D	HAG
1 set	Gasket	721S	CHARCOAL	HAG

Note: hardware assembly provided must meet all requirements for 45 minute fire door assembly.

HARDWARE SET 7

Door Numbers: 4 Lobby
Each opening to receive:

3 ea	Hinges	BB1191 4.5" x 4.5"	US32D	HAG
1 ea	Storeroom Lock	3480 x WTN	US26D	HAG
1 ea	Concealed Closer	608 Series	689	RIX
1 ea	Wall Stop	255W	US32D	HAG
3 ea	Silencers	307D	GREY	HAG

HARDWARE SET 8

Door Numbers: 8 Lunch, 11Locker Room, 15 Canine Isolation, 16 Feline Recovery, 17 Feline Isolation, 18 Behavior Assessment, 19 Intake, 22 Janitor, 23 Food Prep, 24 Exam, 25 Storage, 27 Feline, 28 Feline, 31 Canine Recovery, 32 Surgery Prep, 34 Feline Recovery
Each opening to receive:

3 ea	Hinges	BB1191 4.5" x 4.5"	US32D	HAG
1 ea	Classroom Lock	3470 x WTN	US26D	HAG
1 ea	Concealed Closer	608 Series	689	RIX
1 ea	Stop	255W (@ dr.# 18, 19, 23, 24, 32)	US32D	HAG
1 ea	Wall Stop	232W	US32D	HAG
1 ea	Threshold	413S (@dr.#22)	MIL	HAG
3 ea	Silencers	307D	GREY	HAG

HARDWARE SET 8.1

Door Numbers: 5 Canine Adoption, 13 Meet, 14 Canine Holding, 29 Canine Quarantine, 36 Meet & Greet.
Each opening to receive:

3 ea	Hinges	BB1191 4.5" x 4.5"	US32D	HAG
1 ea	Classroom Lock	3470 x WTN	US26D	HAG
1 ea	Concealed Closer	608 Series	689	RIX
1 ea	Wall Stop	232W	US32D	HAG
1 set	Sound Seal	864S	CLR	HAG
1ea	Automatic Door Bottom	740S	CLR	HAG
1 ea	Threshold	413S	MIL	HAG

HARDWARE SET 9

Door Numbers: 7 Office, 9 Office
Each opening to receive:

3 ea	Hinges	BB1191 4.5" x 4.5"	US32D	HAG
1 ea	Office Lock	3450 x WTN	US26D	HAG
1 ea	Concealed Closer	608 Series	689	RIX

1 ea	Stop	255W	US32D	HAG
3 ea	Silencers	307D	GREY	HAG

HARDWARE SET 10

Door Numbers: 10, 12 Toilet
Each opening to receive:

3 ea	Hinges	BB1191 4.5" x 4.5"	US32D	HAG
1 ea	Privacy Set	3440 x WTN	US26D	HAG
1 ea	Concealed Closer	608 Series	689	RIX
1 ea	Wall Stop	236W	US32D	HAG
3 ea	Silencers	307D	GREY	HAG

HARDWARE SET 11

Door Numbers:
Each opening to receive:

Not Used

HARDWARE SET 12

Door Numbers: 30 Canine Holding, 33 Surgery
Each Opening to receive:

3 ea	Double Acting Spring Hinges	1303 6"	US26D	HAG
2 ea	Push Plates	30S	US32D	HAG
1 ea	Overhead Stop	7000 x CON	US32D	HAG

HARDWARE SET 13

Door Numbers: 3 Toilet
Each opening to receive:

3 ea	Hinges	BB1191 4.5" x 4.5"	US32D	HAG
1 ea	Privacy Set	3440 x WTN	US26D	HAG
1 ea	Wall Stop	255W	US32D	HAG
1 ea	Threshold	413S	MIL	HAG
3 ea	Silencers	307D	GREY	HAG

END OF SECTION

SECTION 088000

GLASS AND GLAZING

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the glass and glazing as shown on the drawings and/or specified herein, including but not limited to glazing of the following:

1. Insulated glass.
2. Tempered glass.
3. Laminated glass.
4. Doors.
5. Storefront framing.
6. Interior borrowed lites.
7. Interior mirrors, frameless.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Hollow metal doors and frames - Section 081113.

H. Aluminum Entrances and Storefronts – Section 084113

I. All glass doors – Section 084228.

J. Framed mirrors - Section 102800.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thicknesses indicated on drawings and/or specified herein are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

   a. Specified Design Wind Loads: 30 psf or greater if required by Code.

2. Probability of Breakage for Vertical Glazing:

   a. 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
   b. 1 lite per 1000 for lites installed 15 degrees from the vertical land and under wind action.
   c. Load Duration: 30 seconds or less.

3. Maximum Lateral Deflection: For glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/100 times the short side length or 3/4", whichever is less.

4. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

a. Temperature Change (Range): 120 deg. F ambient; 180 deg F, material surfaces.

C. Glass units shall be annealed, heat strengthened, fully tempered or laminated where required to meet wind and/or snow loads and safety glazing requirements, as shown, specified or recommended by the glass fabricator and as required by the prevailing Building Code.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for

review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's printed product data, specifications, standard details, glazing instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements, including performance requirements.

C. Submit compatibility and adhesion test reports from sealant manufacturer indicating materials were tested for compatibility and adhesion with glazing sealant, as well as other glazing materials including insulation units.

D. Initial Selection Samples: Submit samples of each glass and glazing material showing complete range of colors, textures, and finishes available for each material used.

1. Submit complete range of samples of standard colors and patterns for ceramic frits at insulating glass.

2. Submit complete range of samples of sandblasted glass showing variations of grits and opacity achieved.

E. Verification Samples: Submit representative samples of each glass and glazing material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide glass samples having minimum size of 144 sq. in. and 6 in. long samples of sealants and glazing materials; all samples shall bear the name of the manufacturer, brand name, thickness, and quality.

F. Calculations: Provide wind load charts, calculations and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied.

G. Test Reports: Provide certified reports for specified tests.

H. Warranties: Provide written warranties as specified herein.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 QUALITY ASSURANCE

A. Experience Requirements

1. Installer: The contractor or subcontractor performing the work of this Section must have successfully completed in a timely fashion at least three projects similar in scope and type to the required work.

B. Source: For each glass and glazing type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.

C. Glass Thickness: Glass thicknesses shown on drawings and/or specified herein are minimum thicknesses. Determine and provide size and thickness of glass products that are certified to meet or exceed performance requirements specified in this Section.

D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.

1. GANA Publications: GANA'S "Glazing Manual" and "Laminated Glass Design Guide."

2. IGMA Publications: IGMA TM-3000, "Vertical Glazing Guidelines for Sealed Insulating Glass Units."

E. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council.

2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

F. Insulating Glass Certification Program: Permanently marked on spacers with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.

2. Associated Laboratories, Inc.

3. Insulating Glass Manufacturers Alliance.

G. Manufacturer shall be ISO 9001-2000 Certified.

1.8 TESTS

A. Preconstruction Sealant Test: Submit samples of materials to be used to glazing sealant manufacturer to determine sealant compatibility. Include samples of glass, gaskets, glazing materials, framing members, and other components and accessories of glazing work. Test in accordance with ASTM C 794 to verify what type of primers (if any) are required to ensure sealant adhesion to substrates.

1. Submit minimum of nine pieces of each type and finish of framing member, and nine pieces of each type, class, kind, condition, and form of glass, including monolithic, laminated, and insulating glass for adhesion tests.

2. Provide manufacturer's written report and recommendations regarding proper installation.

1.9 PROJECT CONDITIONS

A. Weather: Perform work of this Section only when existing or forecasted weather conditions are within limits established by manufacturers of materials and products used.

B. Temperature Limits: Install sealants only when temperatures are within limits recommended by sealant manufacturer, except, never install sealants when temperatures are below 40 deg. F.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations and GANA Manual.

1. Protect materials from moisture, sunlight, excess heat, sparks and flame.

2. Sequence deliveries to avoid delays, but minimize on-site storage.

1.11 WARRANTIES

A. General: Warranties shall be in addition to, and not a limitation of, other rights the City of New York may have under the Contract Documents.

B. Manufacturer's Special Project Warranty on Coated Glass Products: Provide written warranty signed by manufacturer of coated glass agreeing to furnish f.o.b. point of manufacture, within specified warranty period indicated below, replacements for those coated glass units which develop manufacturing defects. Manufacturing defects are defined as peeling, cracking or deterioration in metallic coating due to normal conditions and not due to handling or installation or cleaning practices contrary to glass manufacturer's published instructions.

1. Warranty Period: Manufacturer's standard but not less than five (5) years after date of substantial completion.

C. Manufacturer's Special Project Warranty on Insulating Glass: Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects. Manufacturing defects are defined as failure or hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance; provided the manufacturer's instructions for handling, installing, protecting and maintaining units have been complied with during the warranty period.

1. Warranty Period: Manufacturer's standard but not less than ten (10) years after date of substantial completion.

D. Manufacturer's Special Project Warranty on Laminated Glass: Manufacturer's standard form, made out to City of New York and signed by laminated glass manufacturer agreeing to replace laminated glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty period five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/FABRICATORS

A. All glass and glazing used at the exterior of the Project shall be manufactured by the same manufacturer. The same manufacturer and the same furnace shall be used for all tempered and heat strengthened glass used throughout the project. Acceptable manufacturers include the following:

1. PPG Industries.
2. Guardian Industries.
3. Pilkington.
4. AFG.
5. JE Berkowitz, LP (1-800-257-7827).
6. Viracon.
7. or approved equal.

2.2 GLASS MATERIALS AND PRODUCTS

A. Clear Float Glass: ASTM C 1036, Type I (Transparent, Flat), Class 1 (Clear), Quality q3, minimum 1/4" thick.

B. Clear Tempered Glass: ASTM C 1048, Condition A (Uncoated), Type I (Transparent, Flat), Class 1 (Clear), Quality q3, Kind FT, minimum 1/4" thick. Tempered glass must

be certified by SGCC to meet applicable standards. Tempered glass shall also conform to the following:

1. Length and Width: For 2.9 mm to 6.0 mm; +/-1.6 mm.
2. Diagonal: +/- 3.0 mm.
3. Edgework: Belt seaming or diamond wheels. 1.5 mm seam of upper and lower glass edges. No sharp edges.
4. Corners: No more than 3.0 mm from square.
5. Float Glass Defects: Must meet the requirements of ASTM C 1036. The most common defects are scratches, stones gaseous bubbles and edge chips. Tables in the glass standards have limits for size/quantity of defects.
6. Tempered glass shall have a minimum surface compression of 10,000 psi.
7. Tempered glass to be heat-treated by horizontal (roller hearth) process with inherent roller-wave distortion parallel to the bottom edge of the glass when installed.
8. Flatness Tolerances
    a. Roller-Wave or Ripple: The deviation from flatness at any peak shall be targeted not exceed 0.003" as measured per peak to valley for 1/4" (6mm) thick glass.
    b. Bow and Warp: The bow an warp tolerances shall target a not exceed 1/32" per linear foot.
    c. Fully tempered glass shall be heat soaked to EN 14179-1:2005-European Heat Soaking Standard.

C. Tempered Low 'E' Coated Glass: Provide high-performance, clear, metallic coating, equal to Energy Advantage Low 'E', as manufactured by Pilkington or Commissioner approved equal. Provide Low 'E' coating which has the following performance characteristics when applied to the No. 2 surface of 1" insulating units, both lites 1/4" clear tempered:

1.	Visible Transmittance:	73%
2.	Visible Reflectance	16% (out), 17% (in)
3.	Winter U-value	.33
4.	Shading Coefficient SC:	.71
5.	Solar Heat Gain Coefficient (SHGC)	.62

D. Laminated Safety Glass: Provide two glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, conform to ASTM C 1172, and as follows:

1. Interlayer Colors:

a. Clear.
b. 40% translucent as scheduled.

2. Interlayer Material: Provide Monsanto "Saflex", DuPont "Butacite", or approved equal, 0.030" thick at vertical applications, and 0.060" thick at sloped or horizontal applications.

3. Minimum thickness of 1/4".

E. Insulating Glass: Provide factory assembled units of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space, complying with ASTM E 2190, and as follows:

1. Sealing System: Dual Seal.

2. Primary Sealant: Polyisobutylene.

3. Secondary Sealant: Silicone, General Electric IGS 3204 or IGS 3100, Dow Corning 982, or approved equal.

a. For structurally glazed IG units, secondary seal shall conform to ASTM C 1249.

4. Spacer: Clear finish aluminum with welded, soldered, or bent corners.

5. Desiccant: Molecular sieve, silica gel, or blend of both.

6. Air Space Thickness: 1/2".

7. Glass Thickness: 1/4" minimum.

8. Units shall be certified for compliance with seal classification "CBA" by the Insulating Glass Certification Council (IGCC) or by IGMA and tested in accordance with the above ASTM Test Methods.

9. Insulated glass shall conform to the following:

a. Length and Width: + 3.0 mm/ -2.0 mm.
b. Diagonal: +/- 3.0 mm.
c. Thickness: As agreed +/- 1.0 mm.
d. Edge-Deletion of Coating: Minimum 8 mm wide. Width of deletion must be more than the width of the secondary seal. Silver layer(s) must be completely removed. Appearance must be uniform.
e. Primary PIB Seal: Must be complete with no breaks. Appearance must be uniform. PIB bead must overlap coating. No visible bright line when glass is viewed in transmission. The width of the PIB bead shall be 4.0 mm + 3.0/ - 1.5 mm.
f. Secondary Seal: Nominal 6 mm + 3.0/ - 1.5 mm. The minimum width of the secondary silicone seal for IG units that are glazed structurally must be determined according to ASTM C 1249. The secondary seal must be

uniformly applied without bubbles, cavities or gaps. Avoid excess sealant that will need to be trimmed off later.

F. Frameless Mirrors: 1/4", Quality q2, clear float glass with silver, copper, and organic coating, and as follows:

1. Edges: Uniformly ground and polished.

2.3 GLAZING MATERIALS AND PRODUCTS

A. General: Provide sealants and gaskets with performance characteristics suitable for applications indicated. Ensure compatibility of glazing sealants with insulating glass sealants, with laminated glass interlayers, and with any other surfaces in contact.

B. General Glazing and Cap Bead Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:

1. Dow Corning 795.

2. General Electric Silglaze N 2500 or Contractors SCS-1000.

3. Tremco Spectrem 2.

C. Weather Seal Sealant: Provide non-acid curing sealant with movement range $\pm$ 50%, ASTM C 719. Provide one of the following:

1. Dow Corning 795.

2. General Electric Silpruf.

3. Tremco Spectrem 2.

4. or approved equal

D. Dense Elastomeric Compression Seal Gaskets: Provide molded or extruded neoprene or EPDM gaskets, Shore A hardness of 75$\pm$5 for hollow profile, and 60$\pm$5 for solid profiles, ASTM C 864.

E. Cellular, Elastomeric Preformed Gaskets: Provide extruded or molded closed cell, integral-skinned neoprene, Shore A 40$\pm$5, and 20% to 35% compression, ASTM C 509; Type II.

F. Preformed Glazing Tape: Provide solvent-free butyl-polyisobutylene rubber with 100% solids content complying with ASTM C1281 AAMA A 800 with integral continuous EPDM shim. Provide preformed glazing tape in extruded tape form. Provide Tremco "Polyshim II" or approved equal.

G. Setting Blocks: Provide 100% or silicone blocks with Shore A hardness of 80-90. Provide products certified by manufacturer to be compatible with silicone sealants. Length to be not less than 4". Width for setting blocks to be 1/16" more than glass thickness and high enough to provide the lite recommended by glass manufacturer. When thickness of setting block exceeds 3/4" the glass manufacturer must be consulted

for sizes and configuration. In a vented system, setting block shall be designed so as to not restrict the flow of water within the glazing rabbet to the weep holes.

1. Shims: For shims used with setting blocks, provide same materials, hardness, length and width as setting blocks.

2. Structural Silicone Glazing: Provide silicone setting blocks where structural silicone occurs at sills and at insulating units with silicone edge seals.

H. Edge Blocks: Provide neoprene or silicone as required for compatibility with glazing sealants. Provide blocks with Shore A hardness of 55±5.

I. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place.

J. Miscellaneous Glazing Materials: Provide sealant backer rods, primers, cleaners, and sealers of type recommended by glass and sealant manufacturers.

K. Mirror Adhesive: Palmer's "Mirro-Mastic", or approved equal; mastic must be compatible with mirror backing.

1. Clips: No. 4 finish Type 304 stainless steel.

2.4 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

C. Grind smooth and polish exposed glass edges.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep system.

3. Minimum required face or edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GENERAL GLAZING STANDARDS

A. Install products using the recommendations from the manufacturer of glass, sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those in the "GANA Glazing Manual".

B. Verify that Insulating Glass (IG) Unit secondary seal is compatible with glazing sealants.

C. Install glass in prepared glazing channels and other framing members.

D. Install setting blocks in rabbets as recommended by referenced glazing standards in GANA Glazing Manual" and "IGMA Glazing Guidelines".

E. Provide bite on glass, minimum edge and face clearances and glazing material tolerances recommended by "GANA Glazing Manual".

F. Provide weep system as recommended by "GANA Glazing Manual".

G. Set glass lites in each series with uniform pattern, draw, bow and similar characteristics.

H. Distribute the weight of glass unit along the edge rather than the corner.

I. Comply with manufacturers and referenced industry standards on expansion joint and anchors; accommodating thermal movement; glass openings; use of setting blocks, edge, face, and bite clearances; use of glass spacers; edge blocks and installation of weep systems.

J. Protect glass edge damage during handling and installation.

K. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing or plaster.

L. Remove and replace glass that is broken, chipped cracked or damaged in any way.

3.4 GLAZING

A. Glazing channel dimensions, as indicated on Shop Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

K. Flush Glazing

1. If the butt joint in the metal framing is in the vertical direction, the glazier shall run the tape initially on the head and sill members going directly over this joint. Should the butt joint in the metal framing run horizontally, tapes must first be applied to the jambs so that it crosses over the joint.

2. Each tape section shall butt the adjoining tape and be united with a tool to eliminate any opening.

3. Do not overlap the adjoining length of tape or rubber shim as this will prevent full contact around the perimeter of glass.

L. Off-Set Glazing

1. Where the glazing legs are off-set, the difference in the rabbet width shall be compensated by employing different glazing tapes with different diameter shims. The difference in shim shall be equal to the size of the off-set. The thinner tape shall be positioned first on the glazing leg closest to the interior. The thicker tape

shall be cut to the exact length of the dimension between the applied tapes, and installed on the outermost glazing leg.

2. Immediately prior to setting glass, paper backing shall be removed. Apply a toe bead of sealant 6" in each direction, from each corner.

3. Locate setting blocks in the sill member at quarter points, or if necessary to within 6" of each corner. Setting blocks must be set equal distance from center line of the glass and high enough to provide the recommended bite and edge clearances.

4. Set edge block according to glass manufacturer's recommendations.

5. Set Glass: The glass shall be pressed firmly against the tape to achieve full contact.

6. In a vented system, apply a heel bead (air seal) of sealant around the perimeter of glass, between the sole of the I.G. unit and the base of the rabbet of the metal framing developing a positive bond to the unit and to the metal framing. The bead of the sealant shall be deep enough so that it will partially fill the channel to a depth of 1/4" between the glass edge and the base of the metal framing rabbet.

7. Interior stops shall be set, and glazing tape spline for the appropriate face clearance shall be rolled into place, compressing the glass to the shim within the glazing tape.

3.5 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant as recommended by glass manufacturer or glass frame manufacturer.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape where noted on approved shop drawings.

3.6 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.7 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.8 FRAMELESS MIRRORS

A. Apply mastic to back of mirror "pats" spaced 4 pats/sq. ft.; adjust mirror so that it is plumb and in place to avoid distortion of reflecting images. Allow 1/8" space between back of mirror and wall surface.

1. Apply "pats" using Palmer Electric Applicator.

B. Apply stainless steel clips at mirror top and bottom; securely clip to substrate using non-corrosive anchors. At drywall back-up anchors must be secured to studs or steel wallplate spanning from stud to stud.

3.9 PROTECTION AND CLEANING

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

E. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.

F. Glass to be cleaned according to:

1. GANA Glass Information Bulletin GANA 01-0300 – "Proper Procedure for Cleaning Architectural Glass Products".

2. GANA Glass Informational Bulletin GANA TD-02-0402 – "Heat Treated Glass Surfaces are Different".

G. Do not use razor blades, scrapers or metal tools to clean glass.

END OF SECTION

SECTION 089000

LOUVERS AND VENTS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the louvers and vents as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Aluminum louvers.

2. Motor Operated dampers/ louvers, thermally insulated.

3. Blank off panels.

4. Bird screens.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Masonry - Section 042000.

H. Sealant work - Section 079200.

I. Louvers in metal doors - Section 081113.

J. Louvers connected to ductwork - Division 23.

K. Louvers at Air Outlets and Inlets – Division 23.

1.4 QUALITY ASSURANCE

A. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter or permanent damage to fasteners and anchors.

1. Wind Load: Uniform pressure (velocity pressure) of 30 lbf/sq. ft., acting inward or outward.

B. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, and other detrimental effects.

1. Temperature Change (Range): 120 deg. F., ambient; 180 deg. F, material surfaces.

C. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.

D. Field Measurements: Verify size, location and placement of louver units prior to fabrication.

E. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's specifications, certified test data, where applicable, and installation instructions for required products, including finishes.

C. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.

1. For installed louvers indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

2. Wiring Diagrams: For power, signal, and control wiring for motorized adjustable louvers.

D. Samples: Submit six (6) inch square samples of each required finish. Prepare samples on metal of same gauge and alloy to be used in work. Where normal color and texture

variations are to be expected, include two (2) or more units in each sample showing limits of such variations.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.8 WARRANTY

A. Finish shall be warranted for a period of 20 years, starting from date of Substantial Completion of the Project.

PART 2 PRODUCTS

2.1 LOUVER MATERIAL

A. Provide 1-3/8" deep, frameless "Thinline," Model No. ESU-130S by Greenheck or equal made by Airolite, Construction Specialties, or approved equal meeting these specifications.

B. Material: Blades shall be formed from minimum 0.063" thick aluminum.

C. AMCA Performance: A 4'-0" x 4'-0" unit shall conform to the following:

1. Free Area: 11.40 sq. ft.; 71%.

2. Pressure Drop at Max. Intake Velocity: 0.030 in. wg.

3. Max. Intake Flow Rate: 5705 cfm.

4. Exhaust Volume Flow Rate @ 0.15 in. wg: 14833 cfm.

D. Motorized, Drainable Exxtruded Aluminum dampers/louvers: Extruded aluminum frames and gasketed, insulated louver blades. Frames and blade frames shall have a urethane thermal break; designed to protect air intake and exhaust openings and designed to drain water from the exterior through head frame and blades. Comply with the following requirements:

1. Location: At Skylights.
2. Description:

a. Louver Depth: 6 inches.
b. Frame and Blade Nominal Thickness: 0.081 inch.
c. Insulation: Extruded-polystyrene foam, minimum 1 inch thick.
d. Free Area: 37 and 45 degrees, as per selected product.
e. Operator: Concealed operator, with connecting arm and brackets to operate each row of louver blades.

1) Motor operation with 2-position, spring-return application (with power on, motor opens louver; with power off, spring closes louver); 110-V, 60-Hz motor and limit switch.

3. Performance Requirements:

a. Free Area: 45.75%, unless otherwise indicated.
b. Air Flow Performance: As standard with the selected product.
c. Maximum Pressure Drop: Not more than 0.05 inch wg static pressure drop at 600-fpm free-area velocity.
d. Seal: Mark units with Certified Ratings Seal of authorities having jurisdiction.

E. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

F. Louvers shall be furnished with 1/2" mesh, 0.063" diameter aluminum wire intercrimp bird screen secured in removable extruded aluminum frames.

G. Provide aluminum blank off panels behind louvers where shown on mechanical drawings, fabricated from 1/8" thick aluminum face sheets, finish to match louvers; reinforce as required to form rigid assembly. Blank off panels shall be insulated with thermafiber insulation of thickness needed to insure an R value of eleven (11).

H. Fastenings: Fasteners for exterior application shall be stainless steel. Provide types, gauges and lengths to suit unit installation conditions. Use Phillips flat head machine screws for exposed fasteners, unless otherwise indicated.

I. Anchors and Inserts: Use non-ferrous metal or hot dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

J. Bituminous Paint: SSPC-Paint 12 (cold applied asphalt mastic).

2.2 FABRICATION, GENERAL

A. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.

B. Include supports, anchorages, and accessories required for complete assembly.

C. Provide sill extensions made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.

D. Join frame members to one another and to stationary louver blades by welding, except where indicated otherwise or where field bolted connections between frame members are necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where louvers and vents are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions and directions for the installation of anchorages which are to be embedded in masonry construction. Coordinate the delivery of such items to the project site.

3.3 INSTALLATION

A. Locate and place louver units plumb, level and in proper alignment with adjacent work.

B. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.

D. Repair finishes damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Restore finishes and prime coats of paint so that there is no evidence of corrective work. Return items which cannot be refinished in the field to the shop, make the required alterations, and refinish the entire unit, or provide new units, at Contractor's option.

E. Protect aluminum surfaces from corrosion by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.

F. Provide concealed gaskets, flashings, joint fillers and insulations, and install as the work progresses to make the installations weathertight.

END OF SECTION

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SECTION 092900

GYPSUM DRYWALL

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

B. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the gypsum drywall as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Gypsum board work for shaft wall construction.
2. Abuse-resistant gypsum board where indicated.
3. Plywood sheathing on non-structual metal framing where indicated.
4. Metal supports for gypsum drywall and plywood construction.
5. Sealant for gypsum drywall work.
6. Taping and finishing of drywall joints.
7. Bracing and connections.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Access doors - Section 083113.

H. Painting - Section 099000.

1.4 QUALITY ASSURANCE

A. The following standards, as well as other standards which may be referred to in this Section, shall apply to the work of this Section:

1. The Gypsum Construction Handbook, latest edition, USG.

B. Allowable Tolerances: 1/32" offsets between planes of board faces, and 1/16" in 8'-0" for plumb, level, warp and bow.

C. System Design Load: Provide standard drywall wall assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.

D. Fire-Resistance Rating: Where gypsum drywall with fire resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories, or to design designations in UL "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction, and compliant with UL Test #2079; criteria for cycle movement for all field height wall sections requiring allowance for vertical deflection within framing details.

E. Installer: Firm with not less than three years of successful experience in the installation of specified materials.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).

b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Submit shop drawing for each drywall partition, showing size and gauges of framing members, hanger and anchorage devices, wallboard types, sealant, methods of assembly and fastening, control joints, corner details, joint finishing and relationship of drywall work to adjacent work.

C. Samples: Each material specified herein, 12" x 12", or 12" long, or in manufacturer's container, as applicable for type of material submitted.

D. Manufacturer's Literature: Submit technical and installation instructions for each drywall partition specified herein, and for each fire-rated gypsum board assembly. Submit other data as required to show compliance with these specifications, including data for mold resistant joint compound.

E. Test Reports: This Contractor shall submit test report, obtained by drywall manufacturer, indicating conformance of drywall assemblies to required fire ratings and sound ratings.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for

Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING AND PROTECTION

A. Deliver, store and handle drywall work materials to prevent damage. Deliver materials in their original, unopened containers or bundles, and store where protected from moisture, damage and from exposure to the elements. Store wallboard in flat stacks.

B. Protect wallboard from becoming wet.

1.8 ENVIRONMENTAL CONDITIONS

A. Provide and maintain minimum temperature of fifty-five (55) degrees F. and adequate ventilation to eliminate excessive moisture within the building in the area of the drywall work for at least twenty-four (24) hours, prior to, during and after installation of drywall work. Installation shall not start until windows are glazed and doors are installed, unless openings are temporarily closed. Space above suspended ceilings shall be vented sufficiently to prevent temperature and pressure build up.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers for Gypsum Drywall Panels and Accessories: Materials specified below, unless noted otherwise or specified herein, are those of U.S. Gypsum Co. Equivalent materials of Georgia Pacific, Lafarge North America, National Gypsum Co., or approved equal meeting specification requirements are acceptable.

1. All drywall products must be manufactured in North America.

B. Acceptable Manufacturers for Metal Supports of Drywall Assemblies: Unless otherwise noted, provide products manufactured by Dietrich Metal Framing, Super Stud Building Products, Marino/Ware, Clark Western or approved equal.

2.2 METAL SUPPORTS

A. Metal Floor and Ceiling Runners

1. Channel Type: Formed from 20 U.S. Std. gauge (unless otherwise noted) galvanized steel, width to suit channel type metal studs. Use 20 ga. top runners with 1-1/4" minimum flanges.

2. Ceiling runners and head of wall connections at rated partitions shall conform to UL #2079 for cycle movement. Provide positive mechanical connection of framing to structure, allowing for vertical movement within connections. Minimum of 20 ga. galvanized steel for clips, 25 ga. galvanized steel for ceiling runners. Providing a friction free – anti-seizure movement capacity.

   a. As manufactured by the Steel Network, VertiClip or VertiTrack or equal made by Metal-Lite Inc. or approved equal.
   b. FireTrak (including stud clips) by FireTrak Corp. or equal made by Metal-Lite Inc. or approved equal.

3. "J" Type: Formed from 20 U.S. Std. gauge galvanized steel, 1" x 2-1/2" or 4" wide (to suit detail) x 2-1/4" (for shaft wall).

B. Metal Studs and Framing

1. Channel Type Studs: Channel type with holes for passage of conduit formed from minimum 20 U.S. Std. gauge (unless heavier gauge is required to meet deflection limits) galvanized steel, width as shown on drawings.

2. Continuous 16 gauge x 8" wide steel wall plate screwed to studs as required for support of items supported on drywall partitions and walls.

C. All galvanized steel members shall have coating conforming to ASTM A 653, G60.

2.3 GYPSUM WALLBOARD

A. Mold Resistant Shaft Wall Liner: Solid gypsum board liner for shaft wall construction, 1" thick, 24" wide, as required to suit condition, by standard lengths as required, beveled edges. Provide "Mold Tough Liner Panel" by USG, "DensGlass Ultra Shaft Guard" by Georgia Pacific, Lafarge "Mold Defense Shaftliner Type X" and/or Lafarge "Weather Defense Shaftliner Type X", "Gold Bond Brand Fireshield Shaft Liner XP" by National Gypsum or "Gold Bond Brand EXP Extended Exposure Shaft Liner" by National Gypsum.

1. Liner board must have a rating 10 per ASTM D 3273 with a core that meets ASTM C 1396 Section 6.

B. Abuse Resistant Wallboard: 5/8" thick "Fiberock Brand Panel VHI Abuse Resistant" by USG, "Dens Armor Plus Abuse Guard" by Georgia Pacific, or Lafarge "Protecta AR 100," 48" wide, in maximum lengths available to minimize end-to-end butt joints.

1. Board must achieve a Level 1 rating per ASTM C 1629.

2.4 PLYWOOD

A. Plywood Sheathing: Provide plywood wall sheathing on non-structural metal framing, where indicated; APA Structural 1 Rated Sheathing, Interior grade or better, with span rating to suit stud spacing; thickness as noted on drawings; and fire retardant treated as specified in Section 062000.

2.5 ACCESSORIES

A. Fasteners for Wall Board: USG Brand Screws; Type S Bugle Head for fastening wallboard to lighter gauge interior metal framing (up to 20 ga.). Type S-12 Bugle Head for fastening wallboard to heavier gauge interior metal framing (20 ga. to 12 ga.); Type S and Type S-12 Pan Head for attaching metal studs to door frames and runners; and Type G Bugle Head for fastening wallboard to wall board. Lengths specified below under "Part 3 - Execution" Articles and as recommended by drywall manufacturer.

B. Laminating Adhesive: "Sheetrock Brand Joint Compound"

C. Metal Trim - Corner Beads: For 90 degree External Corners - "Dur-A-Bead" No. 103, 27 U.S. Std. ga. galvanized steel, 1-1/4" x 1-1/4", for 90 degree external corners.

D. Metal Trim - Edge Beads: "Sheetrock Brand Paper Faced Metal Bead and Trim"

E. Metal Trim Treatment Materials and Joint Treatment Materials for Gypsum Drywall Boards: Paper tape for joint reinforcing; Setting Type (Durabond 90) or Lightweight Setting Type Joint Compound for taping and topping; and Ready Mix Compound for finishing.

F. Control Joints: No. 0.093, USG.

G. Acoustical Sealant: USG "Acoustical Sealant" or "Tremco Acoustical Caulking" of Tremco Mfg. Co., or approved equal.

H. Neoprene Gaskets: Conform to ASTM D 1056.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where gypsum drywall is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. General

1. Install drywall work in accordance with drywall manufacturer's printed instructions and as indicated on drawings and specified herein.

2. All metal framing for drywall partitions shall extend from floor to underside of structural deck above. Provide for vertical deflection with positive mechanical connections of framing members to structure.

B. Fire-Rated Assemblies: Install fire-rated assemblies in accordance with requirements of authorities having jurisdiction, Underwriters' Laboratories and test results obtained and published by the drywall manufacturer, for the fire-rated drywall assembly types indicated on the drawings.

C. Sealant

1. Install continuous acoustical sealant bead at top and bottom edges of wallboard where indicated or required for sound rating as wallboard is installed, and between metal trim edge beads and abutting construction.

2. Install acoustical sealant in 1/8" wide vertical control joints within the length of the wall or partitions, and in all other joints, specified below under "Control Joints." Install bead of acoustical sealant around electric switch and outlet boxes, piping, ducts, and around any other penetration in the wallboard; place sealant bead between penetrations and edge of wallboard.

3. Where sealant is exposed to view, protect adjacent surfaces from damage and from sealant material, and tool sealant flush with and in same plane as wallboard surface. Sealant beads shall be 1/4" to 3/8" diameter.

D. Wall Board Application

1. See drawings for all board types. Use fire-rated wallboard for fire-rated assemblies.

2. Apply wallboard with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges.

3. Install wallboard for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.

4. Provide "Thermafiber" safing insulation meeting standards of Section 078413 at flutes of metal deck where partitions carry up to bottom of metal deck.

5. Neatly cut wallboard to fit around outlets, switch boxes, framed openings, piping, ducts, and other items which penetrate wallboard; fill gaps with acoustic sealant.

6. Screw fasten wallboard with power-driven electric screw driver, screw heads to slightly depress surface of wallboard without cutting paper, screws not closer than 3/8" from ends and edges of wallboard.

7. Where studs are doubled-up, screw fasten wallboard to both studs in a staggered pattern.

E. Metal Trim: Install and mechanically secure in accordance with manufacturer's instructions; and finish with three (3) coats of joint compound, feathered and finish

sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions.

1. Corner Beads: Install specified corner beads in single lengths at all external corners, unless corner lengths exceed standard stock lengths.

2. Edge Beads: Install specified edge beads in single lengths at all terminating edges of wallboard exposed to view, where edges abut dissimilar materials, where edges would be exposed to view, and elsewhere where shown on drawings. Where indicated on drawings, seal joint between metal edge bead and adjoining surface with specified gasket, 1/8" wide minimum and set back 1/8" from face of wallboard, unless other size and profile indicated on drawings.

3. Casing beads shall be set in long lengths, neatly butted at joints. Provide casing beads at juncture of board and vertical surfaces and at exposed perimeters.

F. Control Joint Locations: Gypsum board surfaces shall be isolated with control joints where:

1. Ceiling abuts a structural element, dissimilar wall or other vertical penetration.

2. Construction changes within the plane of the partition or ceiling.

3. Shown on approved shop drawings.

4. Ceiling dimensions exceed thirty (30) feet in either direction.

5. Wings of "L," "U," and "T" shaped ceiling areas are joined.

6. Expansion or control joints occur in the structural elements of the building.

7. Shaftwall runs exceed 30' without interruption.

8. Partition or furring abuts a structural element or dissimilar wall or ceiling.

9. Partition or furring runs exceed 30' without interruption.

10. Where control joints are required, ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners.

G. Joint Treatment and Spackling

1. Joints between face wallboards in the same plane, joints at internal corners of intersecting partitions and joints at internal corners of intersections between ceilings and walls or partitions shall be filled with joint compound.

2. Screw heads and other depressions shall be filled with joint compound. Joint compound shall be applied in three (3) coats, feathered and finish surface sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions. Treatment of joints and screw heads with joint compound is also

required where wallboard will be covered by finish materials which require a smooth surface, such as vinyl wall coverings.

3.3 METAL STUD PARTITIONS

A. Runner Installation: Use channel type. Align accurately at floor according to partition layout. Anchor runners securely sixteen (16) inches o.c. maximum with power-driven anchors to floor slab, with power-driven anchors to structural slab above. See "Stud Installation" below for runners over heads of metal door frames. Where required, carefully remove sprayed-on fireproofing to allow partition to be properly installed.

B. Stud Installation

1. Use channel type, positioned vertically in runners, spaced as noted on drawings, but not more than sixteen (16) inches o.c.

2. Anchor studs to floor runners with screw fasteners. Provide snap-in or slotted hole slip joint bolt connections of studs to ceiling runners leaving space for movement. Anchor studs at partition intersections, partition corners and where partition abuts other construction to floor and ceiling runners with sheet metal screws through each stud flange and runner flange.

3. Connection at ceiling runner for non-rated partitions shall be snap-in or slotted hole slip joint bolt connection that shall allow for movement. Seal studs abutting other construction with 1/8" thick neoprene gasket continuously between stud and abutting construction.

4. Connections for fire rated partitions at ceiling runners shall conform to UL Design #2079.

5. Install metal stud horizontal bracing wherever vertical studs are cut or wallboard is cut for passage of pipes, ducts or other penetrations, and anchor horizontal bracing to vertical studs with sheet metal screws.

6. At jambs of door frames and borrowed light frames, install doubled-up studs (not back to back) from floor to underside of structural deck, and securely anchor studs to jamb anchors of frames and to runners with screws. Provide cross braces from hollow metal frames to underside of slab.

7. Over heads of door frames, install cut-to-length section of runner with flanges slit and web bent to allow flanges to overlap adjacent vertical studs, and securely anchor runner to adjacent vertical studs with sheet metal screws. Install cut-to-length vertical studs from runner (over heads of door frame) to ceiling runner sixteen (16) inches maximum o.c. and at vertical joints of wallboard, and securely anchor studs to runners with sheet metal screws.

8. At control joints, in field of partition, install double-up studs (back to back) from floor to ceiling runner, with 1/4" thick continuous compressible gasket between studs. When necessary, splice studs with eight (8) inches minimum nested laps

and attach flanges together with two (2) sheet metal screws in each flange. All screws shall be self-tapping sheet metal screws.

C. Runners and Studs at Chase Wall: As specified above for "Runners" and "Studs" and as specified herein. Chase walls shall have either a single or double row of floor and ceiling runners with metal studs sixteen (16) inches o.c. maximum and positioned vertically in the runners so that the studs are opposite each other in pairs with the flanges pointing in the same direction. Anchor all studs to runner flanges with sheet metal screws through each stud flange and runner flange following requirements of paragraph 3.4, B. Provide cross bracing between the rows of studs by attaching runner channels or studs set full width of chase attached to vertical studs with one self-tapping screw at each end. Space cross bracing not over thirty-six (36) inches o.c. vertically.

D. Wallboard Installation - Single Layer Application (Screw Attached)

1. Install wallboard with long dimension parallel to framing member and with abutting edge joints over web of framing member. Install wallboard with long dimension perpendicular to framing members above and below openings in drywall extending to second stud at each side of opening. Joints on opposite sides of wall shall be arranged so as to occur on different studs.

2. Boards shall be fastened securely to metal studs with screws as specified. Where a free end occurs between studs, back blocking shall be required. Center abutting ends over studs. Correct work as necessary so that faces of boards are flush, smooth, true.

3. Wallboard screws shall be applied with an electric screw gun. Screws shall be driven not less than 3/8" from ends or edges of board to provide uniform dimple not over 1/32" deep. Screws shall be spaced twelve (12) inches o.c. in the field of the board and 8" o.c. staggered along the abutting edges.

4. All ends and edges of wallboard shall occur over screwing members (studs or furring channels). Boards shall be brought into contact but shall not be forced into place. Where ends or edges abut, they shall be staggered. Joints on opposite sides of a partition shall be so arranged as to occur on different studs.

5. At locations where piping receptacles, conduit, switches, etc., penetrate drywall partitions, provide non-drying sealant and an approved sealant stop at cut board locations inside partition.

E. Wallboard Installation - Double-Layer Application

1. General: See drawings for wallboard partition types required.

2. First Layer (Screw Attached): Install as described above for single layer application.

3. Second Layer (Screw Attached): Screw attach second layer, unless laminating method of attachment indicated on drawings or necessary to obtain required sound rating or fire rating. Install wallboard vertically with vertical joints offset thirty-

four (34) inches from first layer joints and staggered on opposite sides of wall. Attach wallboard with 1-5/8" screws sixteen (16) inches o.c. along vertical joints and sixteen (16) inches o.c. in the field of the wallboard. Screw through first layer into metal framing members.

4. Second Layer (Laminated): Install wallboard vertically. Stagger joints of second layer from first layer joints. Laminate second layer with specified laminating adhesive in beads or strips running continuously from floor to ceiling in accordance with manufacturer's instructions. After laminating, screw wallboard to framing members with 1-5/8" screws, spaced twelve (12) inches o.c. around perimeter of wallboard.

F. Wallboard Installation - Laminated Application: Where laminated wallboard is indicated, use specified laminating adhesive, install wallboard vertically and maintain tolerances as specified for screw attached wallboard.

G. Insulation Installation: Install where indicated on drawings. Place blanket tightly between studs.

H. Deflection of Structure Above: To allow for possible deflection of structure above partitions, provide top runners for non-rated partitions with 1-1/4" minimum flanges and do not screw studs or drywall to top runner. Where positive anchorage of studs to top runner is required, anchorage device shall be by means of slotted hole (in clip connection with screw attachment to web of steel through bushings located in slots of clips), or other anchorage device approved by Commissioner.

I. Control Joints

1. Leave a 1/2" continuous opening between gypsum boards for insertion of surface mounted joint.

2. Back by double framing members.

3. Attach control joint to face layer with 9/16" galvanized staples six (6) inches o.c. at both flanges along entire length of joint.

4. Provide two (2) inch wide gypsum panel strip or other adequate seal behind control joint in fire rated partitions and partitions with safing insulation.

3.4 SHAFT WALLS

A. Runner Installation: Use "J" metal runners at floor and ceiling, with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and twenty-four (24) inches o.c.

B. Shaft Wall Liner: Cut shaft wall liner panels one (1) inch less from floor to ceiling height and erect vertically between J-runners.

C. C-H Studs: Cut metal studs 3/8" to not more than 1/2" less than floor to ceiling height and install between shaft wall liner panels so that panels are fitted snugly into the one (1) inch wide "H," "T," or "I" portion of the stud. Space studs twenty-four (24) inches

o.c., unless otherwise indicated on drawings. Install full-length steel E-Studs or J-runners vertically at T-intersections, corners, door jambs, and columns. Install full length E-Studs or J-runners over shaft wall liner both sides of closure panels. Frame openings cut within a liner panel with J-Runner around perimeter. For openings, frame with vertical E-Stud or J-runner at edges, horizontal runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall. Over metal doors, install a cut to length section of runner and attach to strut-studs with clip angles and 3/8" Type S Screws space twelve (12) inches o.c.

D. Wallboard Installation - Double Layer Installation: Erect gypsum wallboard base layer horizontally one side of studs with end joints staggered. Fasten base layer panels to studs with one (1) inch Type S screws twenty-four (24) inches o.c. Caulk perimeter of base layer panels. Apply gypsum wallboard face layer vertically over base layer with joints staggered and attached with 1-5/8" Type S screws staggered from those in base, spaced eight (8) inches o.c. and driven into studs.

E. Wallboard Installation (Where Both Sides of Shaft Wall are Finished): Apply gypsum wallboard face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with one (1) inch or two (2) inches Type S screws spaced eight (8) inches o.c. in field and along edges into studs.

F. Where handrails are indicated for direct attachment to drywall shaft system, provide not less than a sixteen (16) ga. x eight (8) inches wide galvanized steel reinforcement strip, accurately positioned and secured to studs and concealed behind not less than one 1/2" thick course of gypsum board in the system.

G. Integrate stair hanger rods with drywall shaft system by locating cavity of system as required to enclose rods.

3.5 FINISHING

A. Taping: A thin, uniform layer of compound shall be applied to all joints and angles to be reinforced. Reinforcing tape shall be applied immediately, centered over the joint, seated into the compound. A skim coat shall follow immediately, but shall not function as a fill or second coat. Tape shall be properly folded and embedded in all angles to provide a true angle.

B. Filling: After initial coat of compound has hardened, additional compound shall be applied, filling the board taper flush with the surface. The fill coat shall cover the tape and feather out slightly beyond the tape. On joints with no taper, the fill coat shall cover the tape and feather out at least four (4) inches on either side of the tape. No fill coat is necessary on interior angles.

C. After compound has hardened, a finishing coat of compound shall be spread evenly over and extending slightly beyond the fill coat on all joints and feathered to a smooth, uniform finish. Over tapered edges, the finished joint shall not protrude beyond the plane of the surface. All taped angles shall receive a finish coat to cover the tape and taping compound, and provide a true angle. Where necessary, sanding shall be done

between coats and following the final application of compound to provide a smooth surface, ready for painting.

D. Fastener Depressions: Compound shall be applied to all fastener depressions followed, when hardened by at least two (2) coats of compound, leaving all depressions level with the plane of the surface.

E. Finishing Beads and Trim: Compound shall be applied to all bead and trim and shall be feathered out from the ground to the plane of the surface. When hardened, this shall be followed by two (2) coats of compound each extending slightly beyond the previous coat. The finish coat shall be feathered from the ground to the plane of the surface and sanded as necessary to provide a flat, smooth surface ready for decoration.

F. Level of finish for surface exposed to view shall conform to Level 4 of ASTM C 840 and GA-214 of the Gypsum Association.

G. Drywall construction with defects of such character which will mar appearance of finished work, or which is otherwise defective, will be rejected and shall be removed and replaced at no expense to the City of New York.

3.6 CLEANING AND ADJUSTMENT

A. At the completion of installation of the work, all rubbish shall be removed from the building leaving floors broom clean. Excess material, scaffolding, tools and other equipment shall be removed from the building.

B. Work shall be left in clean condition ready for painting or wall covering. All work shall be as approved by Commissioner.

C. Cutting and Repairing: Include all cutting, fitting and repairing of the work included herein in connection with all mechanical trades and all other trades which come in conjunction with any part of the work, and leave all work complete and perfect after all trades have completed their work.

3.7 PROTECTION OF WORK

A. Installer shall advise Contractor of required procedures for protecting drywall work from damage and deterioration during remainder of construction period.

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SECTION 093000

CERAMIC TILE

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

B. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ceramic tile as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Ceramic mosaic floor tile.

2. Ceramic glazed wall tile and matching base.

3. Setting beds, grout, and sealant.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete - Section 033000.

H. Masonry - Section 042000.

I. Thresholds – Section 08710.

1.4 QUALITY ASSURANCE

A. Qualifications of Installers: For cutting, installing and grouting of ceramic tile, use only thoroughly trained and experienced journeyman tile setters who are completely familiar with the requirements of this work, and the recommendations contained in the referenced standards.

B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with the following:

1. Manufacture all ceramic tile in accordance with Standard Grade Requirements of ANSI A-137.1.

2. Install all ceramic tile in accordance with the recommendations contained in Handbook for Ceramic Tile Installation of the Tile Council of America, Inc., latest edition.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Manufacturers product information including large scale drawings showing all shapes and profiles.

C. Samples

1. Before any ceramic tile is delivered to the job site, submit to the Commissioner sample panels, approx. 12" x 12", mounted on hardboard back-up with selected grout color for each color and pattern of ceramic tile and grout specified.

2. Submit 6" length of stone saddles.

D. Master Grade Certificates: Prior to opening ceramic tile containers, submit to the Commissioner a Master Grade Certificate, signed by an officer of the firm manufacturing the ceramic tile used, and issued when the shipment is made, stating the grade, kind of tile, identification marks for tile containers, and the name and location of the project.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Delivery and Storage

1. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.

2. Store all materials under cover in a manner to prevent damage and contamination; store only the specified materials at the job site.

B. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

C. Maintain temperatures at not less than 50 deg. F. in tiled areas during installation and for 7 days after completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS OF TILE

A. Provide tile manufactured by Dal-Tile Corp. as listed on Finish Schedule or equal by American Olean, United States Ceramic Tile Co., Summitville Tiles Inc., or approved equal meeting these specifications.

2.2 WALL TILE AND BASE

A. Provide vitreous, cushion edge units, 1/4" thick, matte glazed, in colors as selected by the Commissioner.

B. Provide sanitary cove base to match wall tile.

2.3 FLOOR TILE

A. Provide porcelain type ceramic mosaic floor tile with all-purpose edge in size, color and pattern as selected by the Commissioner. Tile to have water absorption not to exceed 0.5%.

2.4 TRIM AND SPECIAL SHAPES

A. Provide external and internal corners, trim shapes at openings, and all other trim and special shapes to match the tile specified herein, as required by field conditions and drawing details.

B. Where detailed, provide Schluter "Profiles" finishing and protection edges, trim, etc., or approved equal.

2.5 MORTAR BED, BOND COAT AND GROUT

A. Portland Cement: ASTM C 150, Type I.

B. Hydrated Lime: ASTM C 207, Type S.

C. Sand: ASTM C 144, clean and graded natural sand.

D. Latex – Portland Cement Bond Coat

1. MAPEI, Keralastic System thin set mortar, consisting of Kerabond dry-set mortar and Keralastic latex admixture.

2. Laticrete; 211 dry-set mortar and 4237 latex admixture.

3. or approved equal

E. Wall and Base Tile: Over masonry and concrete use a mortar bed leveling coat conforming to ANSI A108.1A followed by a Latex Portland Cement Bond Coat conforming to ANSI A118.4 and TCA Detail W-211.

F. Floor Tile and Stone Saddle - Thin Set: Set floor tile and stone saddle using latex modified dry set Portland Cement mortar conforming to ANSI A118.4 and TCA Detail F-113.

G. Water: Clean, fresh and suitable for drinking.

H. Grout: For grouting ceramic tile, provide a commercial Portland cement grout "Ultracolor" made Mapei or Laticrete Sanded Grout with Latex Additive or approved equal; color as selected by the Commissioner. Add latex additive to grout made by same manufacturer as grout.

I. Physical Properties: The setting beds and grouts must meet the following physical requirements:

1. Compressive Strength – 3000 psi min.

2. Shear Bond Strength – 500 psi min.

3. Water Absorption – 4.0% max.

4. Service Rating (ASTM C 627) – Extra Heavy Duty.

J. Sealer: Seal all grout joints and all unglazed tile using No. 004 "Keraseal Penetrating Sealer for Unglazed Grout and Tile" by Mapei Corp., "Sealer's Choice 15 Gold" by Aqua Mix Inc., or approved equal.

K. Temporary Protective Coating: Either product indicated below that is applied in the tile manufacturer's factory and formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, applied hot, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg. F. per ASTM D 87.

2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

L. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, equal to "Concentrated Stone & Tile Cleaner" by Aqua-Mix or approved equal, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.6 SEALANT

A. Joint Backing: Preformed, compressible, resilient, non-extruding, non-staining strips of foam neoprene, foam polyethylene, or other material recommended by sealant manufacturer.

B. Bond Breaker: Polyethylene tape, 3 mils thick, or other material recommended by sealant manufacturer.

C. Sealant Primer: Colorless, non-staining, or type to suit substrate surface, as recommended by sealant manufacturer.

D. Sealant: One-part silicone based sanitary sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25. Sealant hardness upon full cure shall be between 20-30 Shore "A" Durometer. Color of sealant to blend with or match adjacent materials, and as selected by the Commissioner. Sealant shall be equivalent to 1700 Sanitary Sealant made by General Electric or equal by Tremco, Dow Corning, or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where ceramic tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not

proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 CONDITION OF SURFACES

A. Allowable Variations in Substrate Levels for Floors: + 1/8" in 10'-0" distance and 1/4" total max. variation from levels shown.

B. Grind or fill concrete and masonry substrates as required to comply with allowable variations.

3.3 PREPARATION

A. Coordinate the following with Section 033000:

1. Steel trowel and fine broom finish concrete slabs that are to receive ceramic tile. Cure concrete slabs that are to receive tile before tile application. Do not use liquid curing compounds or other coatings that may prevent bonding of tile setting materials to slabs. Slab shall be dry at time of tile installation.

B. Etch concrete substrate as may be required to remove curing compounds or other substances that would interfere with proper bond of setting bed. Rinse with water to remove all traces of treatment. Surface must meet finish requirements as noted in ANSI 108.01.

C. Blending: for tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at project site before installing.

D. Field Applied Temporary Protective Coating: Pre-coat tile with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.4 JOINTS IN TILE WORK

A. Joint Widths: 1/16" wide in ceramic tile.

B. Alignment: Wall, base and floor joints shall align through the field and trim. Direction and location of all joints as directed by Commissioner.

C. Movement Joints: Conform to TCA Detail EJ171. Locate where movement joints are in back-up material. Provide movement joint at joints between mop receptors and ceramic tile. Provide movement joint at all vertical internal joints of wall tile. Movement joints 1/8" wide in ceramic tile. Fill all movement joints with specified backing and sealant. Use bond breaker where sufficient space for joint backing does not exist.

1. Provide sealant between ceramic tile and plumbing fixtures, mirrors, pipes, countertops and other dissimilar materials penetrating or adjacent to ceramic tile.

3.5 INSTALLATION

A. Comply with the following installation standards

1. Wall tile over masonry or concrete using dry set mortar - ANSI A108.1 and A108.10.

2. Floor tile using dry set mortar - ANSI A108.5 and A108.10.

B. All setting beds and/or adhesives shall provide for an average contact area of not less than 95%.

C. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.

1. Floors: 1/8" in 10'-0" run, any direction; +/- 1/8" at any location; 1/32" offset at any location.

2. Walls: 1/8" in 8'-0" run, any direction; 1/8" at any location; offset at any location, 1/32".

3. Joints: +/- 1/32" joint width variation of any location; 1/16" in 3'-0" run deviation from plumb and true.

D. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.

E. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.

F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight, aligned joints. Fit tile closely to electrical outlets, piping and fixtures so that plates, collars, or covers overlap tile.

G. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.

3.6 INSTALLATION OF STONE SADDLES

A. Install stone saddles cut to profiles and sizes shown, accurately fitted to jambs, coped at stops, set in full bed of mortar herein specified, and with grouted edge joints as specified for floor tile.

3.7 CLEANING AND PROTECTION

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use cleaners only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning to insure removal of all cleaning material.

3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Apply coat of sealer to all grout joints and all unglazed tile.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings from tile surfaces.

E. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.

END OF SECTION

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SECTION 095150

WOOD COMPOSITE CEILING PANELS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the wood composite ceiling panels as shown on the drawings and/or specified herein, including but not limited to, the following:

1. Interior wood ceiling panel systems.

2. Moldings, trim and accessories.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with all governing laws and building codes.

B. Fabricator Qualifications: Manufacturing facility for panels shall be ISO 9001 certified and provide certification documentation upon request by Commissioner.

C. Installer Qualifications

1. The installer shall have a record of successful installations of similar composite wood panels acceptable to Commissioner and shall be currently approved by the manufacturer of the wood panels.

2. For the actual fabrication and installation of all components of the system, use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

D. Performance Criteria

1. Fire Performance Characteristics: Provide units with surface burning characteristics as determined by testing panel components in accordance with ASTM E 84 test procedures.

a. Units shall be rated Class "A," with a flame spread of 25 or less and a smoke developed of 450 or less.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Shop Drawings: Submit completely dimensioned layouts for all areas where composite wood panels are required, showing:

1. Any deviations from Commissioner's plan layouts and dimensions.

2. Moldings, trim and accessories.

3. Details of construction and installation of wood panels at all conditions.

4. Materials, gauges, thickness and finishes.

C. Samples and Product Literature: Submit the following samples and related manufacturer's descriptive literature.

1. Wood wall panels (12" square sections) including mechanical attachments.

2. 12" long components, including moldings, trim and accessories.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Store, install and maintain units in a secure ambient environment - humidity 35% to 55%; temperature not to exceed 80 degrees F.

C. Before installing units, permit them to reach room temperature and a stabilized moisture content.

D. Handle units carefully to avoid chipping edges or damaging units in any way.

1.8 PROJECT CONDITIONS

A. Do not install units until wet-work in space is completed and nominally dry, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.9 EXTRA STOCK

A. Extra Stock: Deliver stock of maintenance material to City of New York. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.

1. Wood Panels: Furnish quantity of full size units equal to 2.0% of amount installed.

PART 2 – PRODUCTS

2.1 SOLID COMPOSITE PANELS

A. Provide 1/2" thick solid composite, chemically-resistant ceiling panel material. Basis of design product to be "Athlon" manufactured by Trespa North America Ltd. or equivalent product of Prodema: Proligna in the ProdIn Interior Products Group, or approved equal. System shall utilize exposed countersunk fasteners.

1. Color: As scheduled.

2.2 SUSPENSION SYSTEM

A. Provide exposed "T" steel suspension system with low sheen white baked enamel finish equal to "Prelude," 15/16" exposed tee 2-way grid system made by Armstrong World Industries, or equal made by USG Interiors, Inc. or Chicago Metallic Corp.

B. The suspension system shall support the ceiling assembly shown on the drawings and specified herein, with a maximum deflection of 1/360 of the span, in accordance with ASTM C 635.

C. Hanger for suspension system shall be 1" x 3/16", galvanized steel flats or 1/4" diameter galvanized pencil rods spaced 4'-0" o.c. conforming to New York City Code requirements.

D. Main carrying channels, to which suspension systems shall be fastened, shall be 1-1/2" cold rolled galvanized steel channel; spaced 4'-0" o.c., conforming to New York City Code requirements.

E. Provide ceiling clips and inserts to receive hangers, type as recommended by suspension system manufacturer, sizes for pull-out resistance of not less than five (5) times the hanger design load, as indicated in ASTM C 635.

F. Suspension systems shall conform to ASTM C 635, intermediate duty.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine the areas where composite wood panels are to be installed and notify the Commissioner of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the layout.

3.2 INSTALLATION

A. Codes and Standards: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations and industry standards.

B. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not more than 6" from each end, leveling to tolerance of 1/8" in 12'-0".

C. Space rod or flat iron hangers not more than 4'-0" o.c. along main carrying channels; attach by clips or wire ties to building structure. Locate hangers not more than 6" from each end. Space main carrying channels 4'-0" o.c. Attach suspension system to carrying channels using clips or ties, leveling to a tolerance of 1/8" in 12'-0".

D. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, reinforcing, countersplaying or other equally effective means.

E. Install trim members as shown on drawings.

F. Provide for shimming and adjustment as required to maintain consistent alignment of joints and of finished panel faces.

3.3 ADJUST AND CLEAN

A. Clean exposed surfaces; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

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SECTION 096723

EPOXY RESIN COMPOSITION FLOORING AND WALL COATINGS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 WORK INCLUDED

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the epoxy resin composition flooring and base and wall as scheduled on the drawings and/or specified herein.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete - Section 033000.

H. Unit Masonry – Section 042000

I. Painting and Finishing – Section 099000

J. Floor drains - Division 22.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

C. Product Data: Submit manufacturer's technical data application instructions and general recommendations for the epoxy resin composition flooring specified herein.

D. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors and finishes available.

1. Submit 4" x 4" samples of color chips from color chart selection designated by the Commissioner.

E. Material certificates signed by manufacturer certifying that the epoxy resin composition flooring complies with requirements specified herein.

F. Maintenance Instructions: Submit manufacturer's written instructions for recommended maintenance practices.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer or applicator who has specialized in installing resinous flooring types similar to that required for this Project and who is acceptable to manufacturer of primary materials.

B. Single-Source Responsibility: Obtain epoxy resin composition flooring materials, including primers, resins, hardening agents, and finish or sealing coats, from a single manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name and directions for storage and mixing with other components.

B. Store materials to comply with manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Comply with epoxy resin composition flooring manufacturer's directions for maintenance of substrate temperature, moisture, ventilation, and other conditions required to execute and protect Work.

B. Lighting: Permanent lighting will be in place and working before installing resinous flooring.

PART 2 PRODUCTS

2.1 MATERIALS

A. Basis of design for troweled epoxy resin composition flooring shall be:

1. At concrete slab on grade: Dex-O-Tex Cheminert "K" with Posi-Tred "O" top finish as manufactured by Crossfield Products Corp. or equal by Stonhard, General Polymers, or approved equal.

2. At plywood subfloor: Dex-O-Tex Quik Glaze polyspartic top coat over Cheminert K troweled epoxy resin over Cheminert SC membrane over A-81 underlayment as manufactured by Crossfield Products Corp. or equal by Stonhard, General Polymers, or approved equal.

B. Basis of design for epoxy resin chemical resistant wall coating shall be:

1. At masonry walls: Dex-O-TexWallCote E over Resistite polymerized cementitious coating as manufactured by Crossfield Products Corp. or equal by Stonhard, General Polymers, or approved equal.

2.2 PROPERTIES

A. Colors: As scheduled, or if not otherwise indicated, as selected by Commissioner from manufacturer's standard colors.

B. Epoxy Resin Composition Flooring Physical Properties: Provide flooring system that meet or exceed the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

1. Compressive Strength (ASTM C 579): 11,000 psi.

2. Tensile Strength (ASTM C 307): 1643 psi.

3. Flexural Strength (ASTM C 580): 4,300 psi.

4. Flexural Modulus of Elasticity (ASTM C 580): 2.0×10^6 psi.

5. Water Absorption (MIL D-3134): 0.3 percent max.

6. Surface Hardness (ASTM D-2240): 85.5 Durometer "D"

7. Abrasion Resistance (ASTM D-1044): 0.0 gr.

8. Indentation (MIL-D-3134): 0.024" max.

9. Impact Resistance (Gardner Impact Tester): No chipping, cracking, or delamination and not more than 0.014"

10. Adhesion (A.C.I. Comm. No. 403): 400 psi

11. Electrical Conductivity (NFPA 56A): Di-electric

12. Critical Radiant Flux (ASTM E-648): Greater than 1.07 watts/cm^2

13. Co-efficient of Friction - Rubber Shoe Surface (MIL-D-3134 Test Procedure)

Profiles	Static Friction Saltwater Solution on Surface	Static Friction Oil on Surface	Sliding Friction Saltwater Solution on Surface	Sliding Friction Oil on Surface
Fine Profile	0.95	0.75	0.89	0.44
Medium Profile	1.03	0.75	0.95	0.45
Coarse Profile	1.09	0.85	1.00	0.56
Very Coarse Profile	1.24	0.78	1.04	0.59

C. Flexibilized Urethane Epoxy Resin Waterproofing Membrane Properties: provide flooring system that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

Compressive Strength ..... 4,000 psi
Tensile Strength ..... 1,500 psi
Tensile Elongation 96%
Tear Strength..... 120 lb. /in.

D. Polymeric Floor Coating: provide floor coating system that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

Tear Strength, Die C ASTM D624.		879 lbs/in
Flexibility ASTM D1737	180 DEGREE BEND, 1/8" MANDREL.	PASS
Tensile Strength ASTM D412		2400 psi
Taber Abrasion ASTM D-060 (CS17 Wheel, 1000g Load, 1000 Cycles)		8 mg loss
Impact Resistance ASTM D2794 160 in/lbs. Reverse		160 in/lbs. Direct
Elongation ASTM D412		100%
Shore Hardness ASTM D2240-91 Type A		90
Solid Percent by Weight (calculated)		95

Gloss ASTM D523	90+
Coefficient of Friction (slip resistance with leather footwear) ASTM D2047	0.67 dry 0.82 wet

CHEMICAL RESISTANCE ASTM D543 24 Hour Immersion

ACIDS (Organic)	Rating	Weight Change
Citric Acid (1%)	NA	+5%
Lactic Acid (10%)	D	+17%
ACIDS (Mineral)		
Sulfuric Acid (10%)	NA	+6%
Sulfuric Acid (30%)	C	+100%
SOLVENTS		
ISOPROPYL ALCOHOL (99%)	C	+90%
ALKALIS		
Sodium Hydroxide (10%)	NA	+2%
Sodium Carbonate (2%)	NA	5%
Sodium Hypochlorite (5%)	NA	+3%
MISCELLANEOUS COMPOUNDS		
Mineral Oil	NA	<1%
Vegetable Oil	NA	<1%
Aviation Gasoline	NA	+10%
Diesel Fuel	NA	+4%

Rating System
NA = No Attack
D = Deglossed But no Physical Attack
C = Chemical Damage

E. Polycrylate Composition Underlayment: provide system that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

Compressive Strength (ASTM C109)	5,140 psi.
Flexural Strength (ASTM C78)	1,268 psi
Flexural Modulus of Elasticity (ASTM C580)	2,415 psi.
Indentation (MIL-PRF-3134)	0.005" max.
Impact Resistance (Gardner Impact Tester)	No chipping, cracking, or delamination and not more 0.014" indentation
Adhesion (A.C.I. Comm No 503.1)	>400 psi (100% failure in concrete)
Shear Bond Strength (ASTM C882)	410 psi

F. Epoxy Chemical Resistant Wall Coating: provide wall coating that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

Solids Content	100% epoxy solids
Thickness	11 mils
Compressive Strength (ASTM D695)	8,000 psi.
Odor at Installation	Nil
Elongation (ASTM D638)	13%
Surface Hardness (ASTM D2240)	Scale: D: 62
Adhesion (ASTM D695)	Exceeds internal strength of gypsum, board backing
Volatile Organic Content	None
Flexibility (ASTM D522)	Passes 1/8" mandrel at 180° bend Without cracking
Wear Resistance (ASTM D1044)	16mg. Weight loss
Water Absorption (MIL–PRF-3134, Para 4.7.8)	<0.5% psi.
Cleanability (TT–C-550a)	Complies
Flash Point (Tag Closed Cup)	Exceeds 200°F.

G. Polymerized Cementitious Coating: provide polymerized cementitious coating system that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

Thickness	(Note to Specifier: Dex-O-Tex Resistite is applied in two coats, thickness of 1/16" in most circumstances. In job situations requiring greater water retardancy and/or resistance to heavy traffic specify three coat application - 3/32" thickness.)
Compressive Strength (ASTM C109)	2,440 psi.

Tensile Strength (ASTM C109)	430 psi.
Flammability (ASTM E84)	Flame Spread 4 Smoke Density 0
Resistance to Salt Spray (ASTM B117)	1,000 hrs. exposure, No visible degradation
Adhesion (ASTM C882, Type 1)	515 psi.
Freeze-Thaw Resistance (ASTM C672)	Thirty-two cycles, "O" Scaling
Hardness (ASTM D2240)	Durometer A 82
Water Vapor Permeability (ASTM E96)	1.95 perms/inches
Absorption (Weight gain by coated concrete cube after 21 days immersion in water)	< 2%

2.3 SUPPLEMENTAL MATERIALS

A. Joint Sealant: Type recommended or produced by manufacturer of epoxy resin composition flooring system for type of service and joint condition indicated.

B. Waterproofing Membrane: Type recommended or produced by manufacturer of epoxy resin composition flooring system for type of service and floor condition indicated.

1. Polycrylate Composition Underlayment: provide system that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

Compressive Strength (ASTM C109)	5,140 psi.
Flexural Strength (ASTM C78)	1,268 psi
Flexural Modulus of Elasticity (ASTM C580)	2,415 psi.
Indentation (MIL-PRF-3134)	0.005" max.
Impact Resistance (Gardner Impact Tester)	No chipping, cracking, or delamination and not more .014" indentation.
Adhesion (A.C.I. Comm. No. 503.1)	>400 psi (100% failure in concrete)
Shear Bond Strength (ASTM C882)	410 psi

C. Anti-Microbial Additive: at epoxy resin chemical resistant wall coating incorporate anti-microbial chemical additive to prevent growth of most bacteria, fungi, algae and actinomycetes. (Note to Specifier: the use of anti-microbial additive is optional. Its use poses no health hazard.)

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where the epoxy resin composition flooring and epoxy resin chemical resistant wall coating is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Commissioner.

B. Coordinate work with other trades to insure that concrete substrate has been "wet" cured only.

3.2 PREPARATION - FLOORING

A. Substrate: Perform preparation and cleaning procedures according to flooring manufacturer's instructions for particular substrate conditions involved, and as specified. Provide clean, dry, and neutral substrate for flooring application.

B. Concrete Surfaces: Shot-blast, acid etch or power scarify as required to obtain optimum bond of flooring to concrete. Remove sufficient material to provide a sound surface free of laitance, glaze, efflorescence, and any curing compounds or form release agents. Remove grease, oil, and other penetrating contaminants. Repair damaged and deteriorated concrete to acceptable condition. Leave surface free of dust, dirt, laitance, and efflorescence.

C. Materials: Mix resin and hardener, add colorant and aggregate when required, and prepare materials according to flooring system manufacturer's instructions.

3.3 PREPARATION - WALLS

A. Substrate: Perform preparation and cleaning procedures according to manufacturer's instructions for particular substrate conditions involved, and specified. Provide clean, dry substrate.

B. Materials: Mix epoxy resin components when required, and prepare materials according to wall coating system manufacturer's instructions.

3.4 APPLICATION – WALLS

A. General: Apply each component epoxy resin chemical resistant wall coating system according to manufacturer's directions to produce a uniform monolithic wall coating of thickness indicated.

B. Bond Coat: Apply bond coat over prepared substrate at manufacturer's recommended spreading rate.

C. Body Coat: Over bond coat apply epoxy resin chemical resistant wall coating. Overlay adjacent floor base, door frames, etc. as shown on plans.

D. Finish or Sealing Coats: After body coat has cured sufficiently, apply resin finish coat to produce finish matching approved sample and in number of coats and spread rates recommended by manufacturer.

1. Final finish coat shall be in color as approved by the Commissioner.
2. Finished wall coating shall be 11 mils thick, uniform in color and texture.

3.5 APPLICATION – FLOORS

A. General: Apply each component of epoxy resin composition flooring system according to manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated.

B. Bond Coat: Apply bond coat over prepared substrate at manufacturer's recommended spreading rate. Coordinate applying bond coat with topping mix to ensure optimum adhesion between flooring materials and substrate.

C. Body Coat: Over freshly applied primer, trowel apply epoxy mortar mix at 1/4-inch thickness. Hand or power trowel and grout with epoxy to fill voids. When cured, sand if necessary to remove trowel marks and roughness.

D. Finish or Sealing Coats: After body coat has cured sufficiently, apply finish or sealing coats of type recommended by flooring manufacturer to produce finish matching approved sample and in number of coats and spreading rates recommended by manufacturer.

1. Final finish coat shall be in color and skid retardant profile as approved by the Commissioner.

2. Finish floor shall be 1/4" thick, uniform in color and free of travel marks.

E. Cove Base: Apply cove base mix to wall surfaces at locations shown to form cove base height of 4 inches unless otherwise indicated. Round interior and external corners. Follow manufacturer's printed instructions and details including taping, mixing, priming, troweling, sanding, and top-coating of cove base.

F. Joints: Where substrate is interrupted by expansion or control joints, provide joint in flooring to comply with details indicated or, if not otherwise indicated, as recommended by flooring manufacturer.

1. Apply joint sealant materials to comply with resinous flooring manufacturer's recommendations.

3.6 CURING, PROTECTION AND CLEANING – WALLS

A. Cue epoxy resin chemical resistant wall coating materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process. Close application area for a minimum of 24 hours.

3.7 CURING, PROTECTION AND CLEANING – FLOORING

A. Cure epoxy resin composition flooring materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process. Close application area for a minimum of 24 hours.

B. Protect epoxy resin composition flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and application method.

C. Cleaning: Remove temporary covering and clean epoxy resin composition flooring just before final inspections. Use cleaning materials and procedures recommended by flooring manufacturer.

END OF SECTION

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SECTION 098433

ACOUSTIC WALL PANELS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 Section includes

A. Sound deadening acoustical tackable systems.

1.3 Related Sections

A.LEED Submittals - Section 013329.

B.Construction Waste Management - Section 017419.
C.LEED Requirements - Section 018113.
D.Environmental Practices - Section 018116.
E.Construction IAQ Management - Section 018119.
F.VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.
G.Miscellaneous Metals – Section 055000.
H.Carpentry – Section 06200.

1.4 References

A. ASTM E 84-test method for surface burning characteristics of building materials.

B. ASTM D 1037-test methods of evaluating properties of wood-base fiber and particle panel materials.

1.5 Submittals

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a) Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b) The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c) Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d) For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e) Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

C. Product Data: Submit manufacturer's technical data application instructions and general recommendations for the epoxy resin composition flooring specified herein.

D. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors and finishes available.

   1. Submit 6"x6" sample of material.

1.6 Quality Assurance

A. Manufacturer's qualifications:
   1. Minimum (3) three years experience in producing sound-deadening boards of the type specified herein.

1.7 Delivery, Storage, and Handling

A. Store products in manufacturer's unopened packaging with labels intact until ready for installation.

B. Inspect the materials upon delivery to assure that specified products have been received. Report damaged material immediately to the delivering carrier and note such damage on the carrier's freight bill of lading.

C. Store materials in a dry place, indoors, or on raised platform protected from weather damage.

D. Climatize panels to existing moisture conditions and for not less than 24 hours before installation. Comply with manufacturer's recommendations for acclimatization.

PART 2 PRODUCTS

2.1 Manufacturers

A. Acceptable Manufacturer: Homasote Company or approved equal cellulose fiber panel manufacturer.

B. Provide all sound deadening boards from a single manufacturer.

2.2 Materials

A. Sound-deadening boards: Physical properties as follows.
   1. Basis of design: Homasote PINnacle440
   2. Thickness: 1/2 inch (13 mm).
   3. Density: 26-28 pcf (416-448 kg/cu. m) tested in accordance with ASTM C 209.
   4. Tensile Strength: When tested in accordance with ASTM C 209:
      a. Parallel: 450-700 psi (3,100-4,830 kPa).
      b. Transverse: 750-1000 psi (5.1171-6.894 kPa).
   5. Hardness (Janka Ball): 230 lbs (104 kg) tested in accordance with ASTM D 1037.
   6. Water Absorption by Volume: When tested in accordance with ASTM D 1037:
      a. 2 hour immersion: 5 percent maximum.
      b. 24 hour immersion: 15 percent maximum.

7. Expansion: 50 to 90 percent relative humidity, 0.25 percent in accordance with ASTM C 209.
8. Thermal Resistance: When tested in accordance with ASTM C 209 per ASTM C 518:
   a. R-value: 1.2 for 1/2 inch (13 mm) thick board.
   b. K-value: .512 Btu-in/ (h ft² °F).
9. Noise reduction coefficient (NRC): 0.20
10. Flame Spread: 76 to 200 tested in accordance with ASTM E 84, Class III or C.

2.3 Accessories

A. Adhesive: APA AFG-01 approved.

PART 3 EXECUTION

3.1 Examination

A. Examine substrates upon which work will be installed.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify what environmental conditions are, and will continue to be maintained in accordance with manufacturer's recommendations.

D. Starting work by installer is acceptance of substrate and environmental conditions.

3.2 Preparation

A. Follow manufacturer's instructions by separating and allowing panels to be exposed to environmental temperature and humidity conditions for not less than 24 hours before start of installation.

B. Panels must be installed in a clean, dry condition. Do not install wet panels.

3.3 Installation

A. Install in accordance with manufacturer's instructions.

B. Install only clean dry panels. **Do not install wet panels**.

3.4 Adjusting and Cleaning

A. Protect installed products until completion of project. Replace panels that cannot be repaired.

B. Clean by light sanding by using 280-320 grit sandpaper.

END OF SECTION

SECTION 099000

PAINTING AND FINISHING

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the painting and finishing as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Prime painting unprimed surfaces to be painted under this Section.

2. Painting all items furnished with a prime coat of paint, including touching up of or repairing of abraded, damaged or rusted prime coats applied by others.

3. Painting all ferrous metal (except stainless steel) exposed to view.

4. Painting all galvanized ferrous metals exposed to view.

5. Painting interior concrete block exposed to view.

6. Painting gypsum drywall exposed to view.

7. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.

8. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers, lighting fixtures, and the like, which are exposed to view through these items.

9. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.

10. Painting of any surface not specifically mentioned to be painted herein or on drawings, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, shall be included as though specified.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Masonry Sealers – Section 042000.

H. Epoxy Resin Composition Flooring and Wall Coatings – Section 096723.

I. Shop priming is required on some, but not all of the items scheduled to be field painted. Refer to other Sections of work for complete description.

J. Shop coat on machinery and equipment: Refer to the Sections under which various items of manufactured equipment with factory applied shop prime coats are furnished, including, but not necessarily limited to, the following Sections. All items of equipment furnished with prime coat finish shall be finish painted under this Section.

1. Plumbing - Division 22.

2. Heating, ventilation and air conditioning – Division 23.

K. Color Coding of Mechanical Piping and Electrical Conduits – Divisions 22 and 26.

1. This Color Coding consists of an adhesive tape system and is in addition to painting of piping and conduits under this Section, as specified above.

1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

A. Items of equipment furnished with complete factory finish, except for items specified to be given a finish coat under this Section.

B. Non-ferrous metals, except for items specified and/or indicated to be painted.

C. Finished hardware, excepting hardware that is factory primed.

D. Unit masonry.

E. Surfaces not to be painted shall be left completely free of droppings and accidentally applied materials resulting from the work of this Section.

1.5 QUALITY ASSURANCE

A. Job Mock-Up

1. In addition to the samples specified herein to be submitted for approval, apply in the field, at their final location, each type and color of approved paint materials, applied 10 feet wide, floor to ceiling of wall surfaces, before proceeding with the remainder of the work, for approval by the Commissioner. Paint mock-ups to include door and frame assembly.

2. These applications when approved will establish the quality and workmanship for the work of this Section.

3. Repaint individual areas which are not approved, as determined by the Commissioner, until approval is received. Assume at least two paint mock-ups of each color and gloss for approval.

B. Qualification of Painters: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces.

C. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon request from other subcontractors, furnish information on the characteristics of the finish materials proposed to be used, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Commissioner in writing of any anticipated problems using the coating systems as specified with substrates primed by others.

D. All paints must conform to the Volatile Organic Compounds (VOC) standards of prevailing codes and ordinances.

1.6 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the

project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.

d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).

e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Materials List

1. Before any paint materials are delivered to the job site, submit to the Commissioner a complete list of all materials proposed to be furnished and installed under this portion of the work.

2. This shall in no way be construed as permitting substitution of materials for those specified or accepted for this work by the Commissioner.

C. Samples

1. Accompanying the materials list, submit to the Commissioner copies of the full range of colors available in each of the proposed products.

2. Upon direction of the Commissioner, prepare and deliver to the Commissioner two (2) identical sets of Samples of each of the selected colors and glosses painted onto 8-1/2" x 11" x 1/4" thick material; whenever possible, the material for Samples shall be the same material as that on which the coating will be applied in the work.

D. Manufacturer's Recommendations: In each case where material proposed is not the material specified or specifically described as an acceptable alternate in this Section of these specifications, submit for the Commissioner's review the current recommended method of application published by the manufacturer of the proposed material.

1.7 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.8 PRODUCT HANDLING

A. Deliver all paint materials to the job site in their original unopened containers with all labels intact and legible at time of use.

B. Protection

1. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.

2. Use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.

3. Use all means necessary to protect paint materials before, during and after application and to protect the installed work and materials of all other trades.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.9 EXTRA STOCK

A. Upon completion of this portion of the Work, deliver to the City of New York an extra stock of paint equaling approximately ten (10) percent of each color and gloss used and each coating material used, with all such extra stock tightly sealed in clearly labeled containers.

1.10 JOB CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds eighty-five (85) percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.

D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

PART 2 PRODUCTS

2.1 PAINT MANUFACTURERS

A. Except as otherwise noted, provide the painting products listed for all required painting made by one of the manufacturers listed in the paint schedule (Section 2.4) or approved equal. These companies are Benjamin Moore, Akzo Nobel Paint (Glidden Professional) and Sherwin Williams (S-W). Pratt and Lambert Paint. Comply with number of coats and required minimum mil thicknesses as specified herein.

2.2 MATERIALS

A. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommended limits.

B. Colors and Glosses: All colors and glosses shall be as selected by the Commissioner. Certain colors will require paint manufacturer to prepare special factory mixes to match colors selected by the Commissioner. Color schedule (with gloss) shall be furnished by the Commissioner.

C. Coloring Pigment: Products of or furnished by the manufacturer of the paint or enamel approved for the work.

D. Linseed Oil: Raw or boiled, as required, of approved manufacture, per ASTM D 234 and D 260, respectively.

E. Turpentine: Pure distilled gum spirits of turpentine, per ASTM D 13.

F. Shellac: Pure gum shellac (white or orange) cut in pure denatured alcohol using not less than four (4) lbs. of gum per gallon of alcohol.

G. Driers, Putty, Spackling Compound, Patching Plaster, etc.: Best quality, of approved manufacture.

H. Heat Resistant Paint: Where required, use heat resistant paint when applying paint to heating lines and equipment.

2.3 GENERAL STANDARDS

A. The various surfaces shall be painted or finished as specified below in Article 2.4. However, the Commissioner reserves the right to change the finishes within the range of flat, semi-gloss or gloss, without additional cost to the City of New York.

B. All paints, varnishes, enamels, lacquers, stains and similar materials must be delivered in the original containers with the seals unbroken and label intact and with the manufacturer's instructions printed thereon.

C. All painting materials shall bear identifying labels on the containers with the manufacturer's instructions printed thereon.

D. Paint shall not be badly settled, caked or thickened in the container, shall be readily dispersed with a paddle to a smooth consistency and shall have excellent application properties.

E. Paint shall arrive on the job color-mixed except for tinting of under-coats and possible thinning.

F. All thinning and tinting materials shall be as recommended by the manufacturer for the particular material thinned or tinted.

G. It shall be the responsibility of the Contractor to see that all mixed colors match the color selection made by the Commissioner prior to application of the coating.

2.4 SCHEDULE OF FINISHES

A. High Performance Coating On Exterior Galvanized Ferrous Metals

First Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; or "Devran 203 WB Epoxy Primer" by Akzo.

Second Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; or "Devthane 379H Aliphatic Vizethne" by Akzo.

B. High Performance Coating On Exterior Non-Galvanized Ferrous Metals

Prime Coat: "Tneme-Zinc 90/97" by Tnemec; "Interzinc 52" or "315" by International Protective Coatings; "Carbozinc 859, Class B" by Carboline; or "Cathacoat 302V Reinforced Inorganic Zinc Primer" by Akzo.

Second Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; or "Bar-Rust 231V Multi Purpose Epoxy Mastic" by AKZO.

Third Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS" or "990 UHS" by International Protective Coatings;

"Carbothane 133 LH" by Carboline; or "Devthane 379H Aliphatic Urethane" by Akzo.

C. Interior Ferrous Metal

Satin Finish/Latex

Primer:
1 coat Moore Alkyd Metal Primer (Z06)
1 coat Akzo Devflex 4020 PF DTM Prime/Flat Finish or touch-up shop primer
1 coat Sherwin-Williams Pro Industrial Pro-CRVL Universal Primer B66-310
1 coat Pratt and Lambert Steeltech Acrylic Prime or Finish Z190

First Coat:
1 coat Water Borne Satin Impervo (314)
1 coat Akzo: Glidden Professional Diamond 350 Acrylic Eggshell 6P1403
1 coat S-W Proclastic Waterborne Acrylic Satin, B20
1 coat Pratt and Lambert Red Seal Latex Satin Enamel Z2300

Second Coat:
1 coat Water Borne Satin Impervo (314)
1 coat Akzo: Glidden Professional Diamond 350 Acrylic Eggshell 6P1403
1 coat S-W Proclastic Waterborne Acrylic Satin, B20
1 coat Pratt and Lambert Red Seal Latex Satin Enamel Z2300 or Pro-Hide Gold Interior Latex Satin Z9490

a. Total DFT not less than: 3.9 mils

Semi-Gloss Finish/Latex

Primer:
1 coat Iron Clad Latex Low Lustre Metal & Wood Enamel (363)
1 coat Akzo Devflex 4020 PF DTM Primer/Flat Finish or touch-up shop primer.
1 coat Sherwin-Williams, Pro Industrial Pro-CRVL Universal Primer B66-310
1 or 2 coats Pratt and Lambert; Steeltech Acrylic Prime or Finish Z190

First Coat:
1 coat Regal ICI Premium Interior 100% Acrylic Semi-gloss Finish (N333)
1 coat Akzo: Glidden Professional Diamond 350 Acrylic S/G 6P1407
1 coat S-W Proclastic Waterborne Acrylic Satin, B31
1 coat Pratt and Lambert; Pro Hide gold Interior Latex Semi-Gloss Z8300

Second Coat:
1 coat Regal Premium Interior 100% Acrylic Semi-gloss finish (N333)
1 coat Akzo: Glidden Professional Diamond 350 Acrylic S/G 6P1407
1 coat S-W Proclastic Waterborne Acrylic Satin, B31
1 coat Pratt and Lambert; Pro Hide Gold Interior Latex Semi-Gloss Z8300

a. Total DFT not less than: 4.0 mils

D. Interior Drywall

Flat Finish/Vinyl Acrylic Latex

Primer:
1 coat Regal FirstCoat (216)

1 coat Akzo Glidden Professional Gripper GP 3210
1 coat S-W Pro Green 200 Interior Latex Primer, B28-600
1 coat Pratt and Lambert; Pro Hide Gold Interior Latex Wall Primer Z8160

First Coat: 1 coat Regal Wall Satin (215)
1 coat Akzo Glidden Professional Diamond 350 Flat GP 1201
1 coat S-W Pro Green 200 Interior Latex Flat, B30-600
1 coat Pratt and Lambert; Pro Hide Gold Interior Latex Flat Z8100

Second Coat: 1 coat Regal Wall Satin (215)
1 coat Akzo Glidden Professional Diamond 350 Flat GP 1201
1 coat S-W Pro Green 200 Interior Latex Flat, B30-600
1 coat Pratt and Lambert; Pro Hide Gold Interior Latex Flat Z8100

a. Total DFT not less than: 3.6 mils

Eggshell Finish/Vinyl Acrylic Latex

Primer: 1 coat Regal FirstCoat (216)
1 coat Akzo Glidden Professional Gripper GP 3210
1 coat S-W Pro Green 200 Interior Latex Primer, B28-600
1 coat Pratt and Lambert; Pro Hide Gold Interior Latex Wall Primer Z8160

First Coat: 1 coat Regal AquaVelvet (319)
1 coat Akzo Glidden Professional Diamond 350 Acrylic Eggshell GP 1403
1 coat S-W Pro Green 200 Interior Latex Egg-Shell, B20-600
1 coat Pratt and Lambert; Pro Hide Gold Interior Latex Eggshell Z8200

Second Coat: 1 coat Regal AquaVelvet (319)
1 coat Akzo Glidden Professional Diamond 350 Acrylic Eggshell GP 1403
1 coat S-W Pro Green 200 Interior Latex Egg-Shell, B20-600
1 coat Pratt and Lambert; Pro Hide Gold Interior Latex Eggshell Z8200

a. Total DFT not less than: 3.8 mils

E. Interior Concrete Block Sealer: refer to Masonry Sealers – Section 042000.

F. Concrete Floor Densifier and Sealer: "Euco Diamond Hard" by Euclid Chemical Company, or approved equal.

1. Concrete Sealer:

a. Type: Clear, water-based, blend of siliconate polymers.
b. Compliance:
1. Meets maximum VOC content of 400 g/L in accordance with EPA 40 CFR Part 59, Table 1, Subpart D for concrete protective coatings.
2. Meets California and New Jersey air quality standards.
c. VOC Content: 0 g/L.
d. USDA approved.
e. Ultraviolet resistant.

f. Blush resistant.
g. Non-yellowing.
h. No odor.
i. Penetrating.

2. Concrete floor sealer must be chemically resistant to the following floor cleaning products:

a. "RX 101 All-Purpose Cleaner with Airicide" by Airex Laboratories.
b. "Trifectant" by Vétoquinol USA.

2.5 PIPING AND MECHANICAL EQUIPMENT EXPOSED TO VIEW

A. Paint all exposed piping, conduits, ductwork and mechanical and electrical equipment. Use heat resisting paint when applied to heating lines and equipment. The Contractor is cautioned not to paint or otherwise disturb moving parts in the mechanical systems. Mask or otherwise protect all parts as required to prevent damage.

B. Exposed Uncovered Ductwork, Piping, Hangers and Equipment: Latex Enamel Undercoater and one (1) coat Acrylic Latex Flat.

C. Exposed Covered Piping, Duct Work and Equipment: Primer/Sealer and one (1) coat Acrylic Latex Flat.

D. Panel Boards, Grilles and Exposed Surfaces of Electrical Equipment: Latex Enamel Undercoater and two (2) coats Latex Semi-Gloss.

E. Equipment or Apparatus with Factory-Applied Paint: Refinish any damaged surfaces to match original finish. Do not paint over name plates and labels.

F. All surfaces of insulation and all other work to be painted shall be wiped or washed clean before any painting is started.

G. All conduit, boxes, distribution boxes, light and power panels, hangers, clamps, etc., are included where painting is required.

H. All items of Mechanical and Electrical trades which are furnished painted under their respective Contracts shall be carefully coordinated with the work of this Section so as to leave no doubt as to what items are scheduled to be painted under this Section.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where painting and finishing are to be applied and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 GENERAL WORKMANSHIP REQUIREMENTS

A. Only skilled mechanics shall be employed. Application may be by brush or roller. Spray application only upon acceptance from the Commissioner in writing.

B. The Contractor shall furnish the Commissioner a schedule showing when he expects to have completed the respective coats of paint for the various areas and surfaces. This schedule shall be kept current as the job progresses.

C. The Contractor shall protect his work at all times, and shall protect all adjacent work and materials by suitable covering or other method during progress of his work. Upon completion of the work, he shall remove all paint and varnish spots from floors, glass and other surfaces. He shall remove from the premises all rubbish and accumulated materials of whatever nature not caused by others and shall leave his part of the work in clean, orderly and acceptable condition.

D. Remove and protect hardware, accessories, device plates, lighting fixtures, and factory finished work, and similar items, or provide ample in place protection. Upon completion of each space, carefully replace all removed items by workmen skilled in the trades involved.

E. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.

F. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.

G. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the City of New York.

H. All coats shall be dry to manufacturer's recommendations before applying succeeding coats.

I. Do not apply paint behind frameless mirrors that use mastic for adhering to wall surface.

3.3 PREPARATION OF SURFACES

A. Existing Surfaces: Clean existing surfaces requiring paint or finishing, remove all loose and flaking paint or finish and sand surface smooth as required to receive new paint or finish. No "telegraphing" of lines, ridges, flakes, etc., through new surfacing is permitted. Where this occurs, Contractor shall be required to sand smooth and re-finish until surface meets with Commissioner's approval.

B. General

1. The Contractor shall be held wholly responsible for the finished appearance and satisfactory completion of painting work. Properly prepare all surfaces to receive paint, which includes cleaning, sanding, and touching-up of all prime coats applied

under other Sections of the work. Broom clean all spaces before painting is started. All surfaces to be painted or finished shall be perfectly dry, clean and smooth.

2. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.

3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

C. Metal Surfaces

1. Weld Fluxes: Remove weld fluxes, splatters, and alkali contaminants from metal surfaces in an approved manner and leave surface ready to receive painting.

2. Bare Metal: Thoroughly clean off all foreign matter such as grease, rust, scale and dirt before priming coat is applied. Clean surfaces, where solder flux has been used, with benzene. Clean surfaces by flushing with mineral spirits. For aluminum surfaces, wipe down with an oil free solvent prior to application of any pre-treatment.

   a. Bare metal to receive high performance coating specified herein must be blast cleaned SSPC SP-6 prior to application if field applied primer; coordinate with steel trades furnishing ferrous metals to receive this coating to insure that this cleaning method is followed.

3. Shop Primed Metal: Clean off foreign matter as specified for "Bare Metal." Prime bare, rusted, abraded and marred surfaces with approved primer after proper cleaning of surfaces. Sandpaper all rough surfaces smooth.

4. Galvanized Metal: Prepare surface as per the requirements of ASTM D 6386.

5. Metal Filler: Fill dents, cracks, hollow places, open joints and other irregularities in metal work to be painted with an approved metal filler suitable for the purpose and meeting the requirements of the related Section of work; after setting, sand to a smooth, hard finish, flush with adjoining surface.

D. Gypsum Drywall Surfaces: Scrape off all projections and splatters, spackles all holes or depressions, including taped and spackled joints, sand smooth. Conform to standards established in Section 092900, "Gypsum Drywall."

E. Wood Surfaces: Sand to remove all roughness, loose edges, slivers, or splinters and then brush to remove dust. Wash off grease or dirt with an approved cleaner. Fill all cracks, splits, nail holes, screw holes, and surface defects with putty after the priming coat has been applied. Putty shall be brought up flush with the surface and sanded smooth and touched-up with primer when dry.

F. Block Masonry Surfaces: Thoroughly clean off all grit, grease, dirt mortar drippings or splatters, and other foreign matter. Remove nibs or projections from masonry surfaces.

Fill cracks, holes or voids, not filled under the "Masonry" Section, with Portland cement grout, and bag surface so that it has approximately the same texture as the adjacent masonry surface.

G. Testing for Moisture Content: Contractor shall test all plaster, masonry, and drywall surfaces for moisture content using a reliable electronic moisture meter. Contractor shall also test latex type fillers for moisture content before application of top coats of paint. Do not apply any paint or sealer to any surface or to latex type filler where the moisture content exceeds seven (7) percent as measured by the electronic moisture meter.

H. Touch-Up: Prime paint all patched portions in addition to all other specified coats.

3.4 MATERIALS PREPARATION

A. Mix and prepare painting materials in strict accordance with the manufacturer's directions.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.

C. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.

D. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.5 APPLICATION

A. General

1. Apply paint by brush or roller in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by the paint manufacturer for material and texture required.

2. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried. Sand between each enamel or varnish coat application with fine sandpaper, or rub surfaces with pumice stone where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.

3. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.

4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.

    a. "Exposed surfaces" is defined as those areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.

5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint, before final installation of equipment.

6. Paint the back sides of access panels, removable or hinged covers to match the exposed surfaces.

7. Finish doors on tops, bottoms, and side edges the same as the faces, unless otherwise indicated.

8. Enamel finish applied to wood or metal shall be sanded with fine sandpaper and then cleaned between coats to produce an even surface.

9. Paste wood filler applied on open grained wood after beginning to flatten, shall be wiped across the grain of the wood, then with a circular motion, to secure a smooth, filled, clean surface with filler remaining in open grain only. After overnight dry, sand surface with the grain until smooth before applying specified coat.

B. Scheduling Painting

1. Apply the first coat material to surfaces that have been cleaned, pre-treated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

2. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Prime Coats: Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

D. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.

E. "Touching-Up" of Factory Finishes: Unless otherwise specified or shown, materials with a factory finish shall not be painted at the project site. To "touch-up," the Contractor shall use the factory finished material manufacturer's recommended paint materials to repair abraded, chipped, or otherwise defective surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing, and repainting, as acceptable to the Commissioner.

B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.7 CLEAN UP

A. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.

B. Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION

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SECTION 101400

SIGNAGE

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the signage as shown on the drawings and/or specified herein.

1. Exterior signage.

2. Memorial signage.

3. Miscellaneous signage required by code, and as scheduled.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Electrical - Division 26, for exit signs.

1.4 QUALITY ASSURANCE

A. For actual installation of signage, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the required skills.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's technical data and installation instructions for each type of signage required.

C. Samples: Submit samples of each type of signage showing finishes, colors, surface textures and qualities of manufacture and design of each sign component including graphics.

D. Shop Drawings: Submit shop drawings for fabrication and erection of signage. Include plans, elevations, and large scale details of sign wording and lettering layout. Show anchorage and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 SIGNS

A. NOTE: Actual graphic design copy, including all font design, signage materials, colors and finishing will be submitted under separate cover, except as noted herein.

B. Exterior Signage (Basis of Design): Provide "île 234S" by Marcal, available through Signflow LLC (signflow.us), or approved equal by custuom signage manufacturer acceptable to the Commissioner; www.marcal.fr. For graphic design. refer to graphics package submitted under separate cover

C. Exterior Post Mounted Signage: Provide posts

1. Material: Structural extruded aluminum alloy 6063-T6, 0.09" and .125" thickness minimum.
2. Post profile: Circular
3. Finish and color: Architectural mill finish aluminum.
4. Design post for panel size; individual lengths required by manufacturer for in ground mount.

D. Memorial Signage: Provide stone plaques set flush into CMU site wall, both with engraved text, as part of the signage package to be submitted under separate cover.

1. Flush, Wall-Mounted Stone Plaques: Provide stone plaque (exterior) and one stone plaque (interior), as indicated on the Finish Schedule. Mount plaques to the wall with stainless steel ties, set with grout or plaster.

E. Fire egress, floor, and other signs required by code, and other signage as scheduled, shall be selected by the Commissioner, to conform to City of New York signage standards.

1. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surfaces, in contrasting color.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where signage is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install units and components at the locations directed by the Commissioner, securely mounted with concealed theft-resistant fasteners. Attach to substrates in accordance with the manufacturer's instructions.

B. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces. Repair or replace damaged units as directed by the Commissioner.

END OF SECTION

SECTION 102800

TOILET ACCESSORIES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the toilet accessories as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Masonry - Section 042000.

H. Gypsum board partitions - Section 092900.

I. Ceramic tile - Section 093000.

1.4 QUALITY ASSURANCE

A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units. Accessories shall be installed at heights in compliance with prevailing Handicapped Code.

C. Products: Unless otherwise noted, provide products of same manufacturer for each type of unit and for units exposed in same areas.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets,

manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's technical data, catalogue cuts and installation instructions for each toilet accessory.

C. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices in other work

D. Submit schedule of accessories indicating quantity and location of each item.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Deliver accessories to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name. Delivered materials shall be identical to approved samples.

PART 2 PRODUCTS

2.1 MATERIALS

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge minimum, unless otherwise indicated.

B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Galvanized Steel Sheet: ASTM A 653, G60.

D. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

E. Mirrors: ASTM C 1503, mirror glazing quality, clear glass mirrors, nominal 1/4" thick.

2.2 FASTENING DEVICES

A. Exposed Fasteners: Theftproof type, chrome plated, or stainless steel; match finishes on which they are being used.

B. Concealed Fasteners: Galvanized (ASTM A 123) or cadmium plated.

C. No exposed fastening devices permitted on exposed frames.

D. For metal stud drywall partitions, provide ten (10) gauge galvanized sheet concealed anchor plates for securing surface mounted accessories.

2.3 FABRICATION

A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted. Unobtrusive labels on surfaces not exposed to view are acceptable. Where locks are required for a particular type of toilet accessory, provide same keying throughout project. Furnish two keys for each lock.

B. Surface-Mounted Toilet Accessories, General: Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage.

C. Recessed Toilet Accessories, General: Fabricate units of all welded construction, without mitered corners. Hang doors of access panels with full-length stainless steel piano hinge. Provide anchorage which is fully concealed when unit is closed.

2.4 MANUFACTURERS

A. Provide products manufactured by Bobrick Washroom Equipment Co., American Specialties, Inc., Bradley Corp., American Standard, or approved equal.

2.5 ACCESSORY SCHEDULE

A. See Schedule on drawings.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where toilet accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do

not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 PREPARATION

A. Accessories which are to be partition mounted shall be closely coordinated with other trades, so that the necessary reinforcing is provided to receive the accessories.

B. Furnish templates and setting drawings and anchor plates required for the proper installation of the accessories at gypsum drywall and masonry partitions. Coordinate the work to assure that base plates and anchoring frames are in the proper position to secure the accessories.

C. Verify by measurements taken at the job site those dimensions affecting the work. Bring field dimensions which are at variance with those on the approved shop drawings to the attention of the Commissioner. Obtain decision regarding corrective measures before the start of fabrication of items affected.

D. Cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

3.3 INSTALLATION

A. Install accessories at locations indicated on the drawings, using skilled mechanics, in a plumb, level and secure manner.

B. Concealed anchor assemblies for gypsum drywall partitions shall be securely anchored to metal studs to accommodate accessories. Assemblies shall consist of plates and/or angles tack welded to studs.

C. Secure accessories in place, at their designated locations by means of theftproof concealed set screws, so as to render removing of the accessory with a screwdriver impossible.

D. Unless otherwise indicated, accessories shall conform to heights from the finished floor as shown on the drawings. Where locations are not indicated, such locations shall be as directed by the Commissioner.

E. Installed accessories shall operate quietly and smoothly for use intended. Doors and operating hardware shall function without binding or unnecessary friction. Dispenser type accessories shall be keyed alike. Prior to final acceptance, master key and one duplicate key shall be given to City of New York's authorized agent.

F. The Commissioner shall be the sole judge of workmanship. Workmanship shall be of the highest quality. Open joints, weld marks, poor connections, etc., will not be permitted. The Commissioner has the right to reject any accessory if he feels the workmanship is below the standards of this project.

G. Grab bars shall be installed so that they can support a three hundred (300) lb. load for five minutes per ASTM F 446.

3.4 CLEANING AND PROTECTION

A. Upon completion of the installation, clean accessories of dirt, paint and foreign matter.

B. During the installation of accessories and until finally installed and accepted, protect accessories with gummed canvas or other means in order to maintain the accessories in acceptable condition.

C. Replace and/or repair installed work which is damaged or defective to the City of New York's satisfaction, at no additional cost.

END OF SECTION

SECTION 104416

FIRE EXTINGUISHERS AND CABINETS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the fire extinguishers and cabinets as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Masonry walls - Section 042000.

H. Gypsum drywall - Section 092900.

I. Fire suppression systems - Division 22.

J. Fire hose cabinets and valve cabinets - Division 22.

1.4 QUALITY ASSURANCE

A. Provide portable fire extinguishers, cabinets and accessories by one 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.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for

review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. For fire extinguisher cabinets include roughing-in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style and materials. Where color selections by Commissioner are required, include color charts showing full range of manufacturer's standard colors and designs available.

C. Samples: Submit samples, 6" square, of each required finish. Prepare samples on metal of same gauge as metal to be used in the work. Where normal color variations are to be expected, include 2 or more units in each sample showing the limits of such variations.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following:

1. J.L. Industries.
2. Larsen's Mfg. Co.
3. Potter Roemer.
4. or approved equal

2.2 EXTINGUISHERS

A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Commissioner from manufacturer's standard which comply with requirements of governing authorities.

B. Abbreviations indicated below to identify extinguisher type related to UL classification and rating system and not necessarily to type and amount of extinguishing material contained in extinguisher.

C. Multi-Purpose Dry Chemical Type: UL rated 2A-10B:C, 5 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

2.3 MOUNTING BRACKETS

A. Provide manufacturer's standard bracket designed to prevent accidental dislodgment of extinguisher, of proper size for type and capacity of extinguisher specified, in manufacturer's standard enamel finish; color to match extinguisher.

2.4 CABINETS

A. Type and Style: Fire extinguisher cabinets shall be metal, recessed, with plexiglass panel, sized to fit within the partition or wall depth. Provide fire rated cabinets within fire rated partitions.

B. Color: Fire extinguisher cabinets shall be factory pre-finished with baked enamel in the colors selected by the Commissioner from the standard range of colors of the selected manufacturer.

C. Design is based on "Model G-2409-R1" of Larsen's Mfg. Co. Other manufacturers noted herein may substitute their equivalent cabinet upon acceptance by the Commissioner.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where fire extinguishers and cabinets are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install items included in this Section in locations indicated and at heights to comply with applicable regulations of governing authorities.

1. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

2. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

B. Where exact location of cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by the Commissioner.

3.3 IDENTIFICATION

A. Identify fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" painted on door by silk-screen process or die cut lettering. Provide lettering on door as selected by Commissioner from manufacturer's standard letter sizes, styles, colors and layouts.

B. Identify bracket-mounted extinguishers with red letter decals spelling 'FIRE EXTINGUISHER' applied to wall surface. Letter size, style and location as selected by the Commissioner.

3.4 SERVICE

A. Determine the approximate completion date of the work and then inspect, charge, and tag the fire extinguishers at a date not more than 10 days before or not less than one day before actual completion date of the work.

END OF SECTION

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SECTION 105113

LOCKERS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the lockers as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Steel wardrobe lockers, furnished by the City of New York and installed by the Contractor.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete slab - Section 033000.

1.4 QUALITY ASSURANCE

A. Qualifications of Installers: For installation of lockers, use only personnel who are thoroughly trained and experienced in the skills involved and who are completely familiar with the manufacturer's recommended methods of installation.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Shop Drawings: Before any materials of this Section are delivered to the job site, submit complete shop drawings, technical data and installation instructions to the Commissioner. Shop drawing must show method of installation, fillers, trim and accessories. Include locker sequencing information.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Wardrobe Lockers: Furnished by the City of New York and installed by the Contractor.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where lockers are to be installed, and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install metal lockers at locations shown in accordance with manufacturer's instructions for plumb, level, rigid and flush installation.

B. Space fastenings 36" o.c. and apply through back-up reinforcing plates where necessary to avoid metal distortion; conceal all fasteners.

C. Install trim, sloping top units, and metal filler panels using concealed fasteners to provide flush, hairline joints against adjacent surfaces.

3.3 ADJUST AND CLEAN

A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.

B. Touch-up marred finishes, but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION

SECTION 114520

STAINLESS STEEL COUNTERS AND LEDGES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the stainless steel counters and equipment as indicated on the drawings and specified herein, including but not limited to, the following:

1. Stainless steel counters.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Miscellaneous metals - Section 055000, for support brackets.

H. Templates for cut-outs required for mechanical and electrical services - Divisions 23 and 26.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Shop Drawings: Include plans, elevations, sections, roughing-in dimensions, fabrication details, service requirements, and attachments to other work.

C. Samples: Of each type of exposed finish required, minimum 8" square or 6" long sections of linear shapes and of same thickness and material indicated for work.

1.5 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing stainless steel counters, who has completed installations similar in design and extent to that indicated for this Project, and who has a record of successful in service performance.

B. Manufacturer Qualifications: Engage a firm experienced in manufacturing stainless steel counters similar to that indicated for this Project.

C. Joints: No visible joints or signs of welding permitted where exposed to view. Joints permitted only where not on drawings or as shown on approved shop drawings.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver stainless steel counters as factory assembled units with protective crating and covering.

B. Store counters in original protective crating and covering and in a dry location.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of stainless steel counter installation areas by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avid delaying the work.

1.9 COORDINATION

A. Coordinate layout and installation with other work, including plumbing components.

B. Coordinate location and requirements of service utility connections.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel Sheet, Strip, Plate, and Flat Bar: ASTM A666, Type 304, stretcher leveled, and in finish specified in "Stainless Steel Finishes" Article.

B. Stainless Steel Tube: ASTM A554, Grade MT-304, and in finish specified in "Stainless Steel Finishes" Article.

C. Fiberglass Core: Rigid fiberglass core equal to No. 703 by Owens Corning or approved equal; 3/4" thick.

D. Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT. Provide elastomeric sealant NSF certified for end use application indicated. Provide sealant that, when cured and washed, meets requirements of Food and Drug Administration's 21 CFR, Section 177.2600 for use in areas that come in contact with food.

1. Color: As selected by Commissioner from manufacturer's full range of colors.

2. Backer Rod: Closed cell polyethylene, in diameter larger than joint width.

E. Sound Dampening: NSF certified, non-absorbent, hard drying, sound deadening coating. Provide coating compounded for permanent adhesion to metal in 1/8" thickness that does not chip, flake, or blister.

F. Gaskets: NSF certified for end use application indicated; of resilient rubber, neoprene, or PVC that is non-toxic, stable, odorless, non-absorbent, and unaffected by exposure to foods and cleaning compounds.

2.2 FABRICATION, GENERAL

A. Fabricated counters of stainless steel with rigid fiberglass core. Factory assembly counters.

B. Welding: Use welding rod of same composition as metal being welded. Use methods that minimize distortion and develop strength and corrosion resistance of base metal. Provide ductile welds free of mechanical imperfections such as gas holes, pits, or cracks.

1. Welded Butt Joints: Provide full penetration welds for full joint length. Make joints flat, continuous, and homogenous with sheet metal without relying on straps under seams, filling in with solder, or spot welding.

2. Grind exposed welded joints flush with adjoining material and polish to match adjoining surfaces so that joint is imperceptible.

3. Where fasteners are welded to underside of equipment, finish reverse side of weld smooth and undepressed.

4. Welded edges shall be square 90 degrees, no chamfers.

C. Form metal with break bends that are not flaky, scaly, or cracked in appearance; where breaks mar uniform surface appearance of material, remove marks by grinding, polishing, and finishing.

D. Sheared Metal Edges: Finish free of burrs, fins, and irregular projections.

E. Provide surfaces free from exposed fasteners.

F. Cap exposed fastener threads with stainless steel lock washers and stainless steel cap (acorn) nuts.

G. Provide pipe slots on equipment with turned up edges and sized to accommodate service and utility lines and mechanical connections.

H. Provide enclosures, including panels, housings, and skirts, to conceal service lines, operating components, and mechanical and electrical devices, unless otherwise indicated.

2.3 STAINLESS STEEL EQUIPMENT

A. Edges and Backsplashes: Provide edges and backsplashes indicated fabricated of 0.071" thick stainless steel.

B. Apply sound dampening to underside of metal work surfaces, including sinks and similar units. Provide coating with smooth surface and hold coating 1" back from open edges for cleaning.

C. Tops: Minimum 0.0781" thick stainless steel, unless otherwise indicated.

D. Sinks: Fabricate of minimum 0.0781" thick stainless steel with fully welded, 1 piece construction. Construct 2 sides and bottom of sink compartment from 1 stainless steel sheet with ends welded integral and without overlapping joints or open spaces between compartments. Provide double wall partitions between compartments with 1/16" radius rounded tops that are welded integral with sink body. Cove horizontal, vertical, and interior corners with 1/16" radius. Pitch and crease sinks to waste for drainage without pooling. Seal wastes in die stamped depressions without solder, rivets, or welding.

2.4 STAINLESS STEEL FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

1. Remove or blend tool and die marks and stretch lines into finish.

2. Grind and polish surfaces to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

3. Concealed Surfaces: No. 2B finish (bright, cold rolled, unpolished finish).

4. Exposed Surfaces: No. 4 finish (satin, directional polish).

5. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

6. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances, service utility connections, and other conditions affecting installation and performance of stainless steel counters. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Examine roughing in for piping, mechanical, and electrical systems to verify actual locations of connections before installation.

3.2 INSTALLATION

A. Install stainless steel counters level and plumb, according to manufacturer's written instructions, original design, and referenced standards.

B. Provide cut-outs in stainless steel counters neatly formed, where required to run service lines through equipment to make final connections.

C. Securely anchor and attach items and accessories to walls, floors and bases with stainless steel fasteners.

D. Install trim strips and similar items requiring fasteners in a bed of sealant. Fasten with stainless steel fasteners at 48" o.c. maximum.

E. Install sealant in joints between equipment and abutting surfaces with continuous joint backing, unless otherwise indicated. Provide airtight, watertight, vermin-proof, sanitary joints.

3.3 PROTECTING

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure stainless steel counters is without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 124814

FLOOR MATS AND FRAMES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the floor mats and frames as shown on the drawings and specified herein.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete recess - Section 033000.

1.4 QUALITY ASSURANCE

A. Manufacturer: Except as otherwise indicated, provide entrance mats and accessories by a single manufacturer for entire project.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacture's specifications and installation instructions or entrance mat. Include methods of installation for each type of substrate.

C. Samples: Submit samples for each type and color of exposed entrance mat, frames and accessories required. Provide 12" square samples of mat including frame.

D. Shop Drawings: Provide in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.

E. Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining and rehandling of removable entrance mat units.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 - PRODUCTS

2.1 MAT ASSEMBLY

A. Furnish and install KD98 stainless steel floor grate manufactured by Kadee Industries or equal by Mats Inc., Pawling Corp., or approved equal.

B. Tread Material: Type 304 stainless steel 0.070" x 0.177" surface wire, No. 4 satin finish.

1. Wire Spacing: Standard slot openings of 0.125".

C. Support Rods: Type 304 Stainless steel 0.070" x 1", spaced 1" on center.

D. Framing: Type 304 stainless steel with unit construction to support 300 pounds per sq. ft.

E. Accessories: Provide hidden locking devices to prevent warping and rattling. Furnish number of lock downs as recommended by manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where floor mats and frames are to be installed and notify the Commissioner of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. Install mat frames integrally with principal pour of concrete floor system. Locate, align and level frame members accurately.

B. Protection: Upon completion of frame installations and concrete work, provide temporary filler of plywood or fiberboard in mat recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and project reaches substantial completion.

C. Delay installation of mats until work on the project reaches substantial completion.

D. Install grating mat in frame and anchor with hidden lock downs.

END OF SECTION

SECTION 131915

ANIMAL CAGES

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the animal kennels and cages as shown on the drawings and/or specified herein.

1. Stackable canine and feline cages.

2. Field-assembled canine cages.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete Anchors – Section 033000.

H. Unit Masonry Anchors – Section 042000.

1.4 QUALITY ASSURANCE

A. For actual installation of signage, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the required skills.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's technical data and installation instructions for each type of signage required.

C. Shop Drawings: Submit shop drawings for kennel layouts and elevations for all areas, with dimensions, materials, finishes, details of construction, fastening and achoring consitions and relation to adjoining construction.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Subject to compliance with requirements, provide products manufactured by Shor-line, or approved equal.

1. Shor-line 511 Osage Ave., Kansas City, KS, 800-444-1579 products are specified as basis for project design.

2. Acceptable Manufacturers: Mason Company, 260 Depot St., Leesburg, OH, 800-543-5567, or approved equal.

2.2 CAGES (STACKABLE)

A. Assembled, stackable feline and canine cages shall comply with the following requirements:

1. Shell Material: 22ga type 304 stainless steel, stain finish.

2. Shell Construction: Two-piece seam welded construction. All cages shall have a urine-retaining lip to prevent spillage out the front of the cage.

3. Frame Material: 1" square tube, type 304 stainless steel

4. Frame Construction: Stainless steel floor brace channel. There shall be at least two on cages 36" wide and larger. Nylon inserts with hi-low screws shall be used in the frame for hardware attachement.

5. Door Material: 304 sytpe stainless steel; electropolish to satin finish, with no sharp areas on door welds or rod ends.

6. Door Construction: Doors shall be easily removable with a hinge system that allows them to be removed without the use of tools. Doors shall be reversed to accommodate right hand or left hand opening without additional hardware. Latch and frame bars shall be 3/8" diameter, additional horizontal bars, 1/4" diameter, and vertical rods 3/16" diameter spaced on 1-3/16" centers. Double-door kennels shall have "quick removal center post". Door shall have bottom loops to prevent paper from falling out. Door shall fit securely inside kennel with no gaps between kennel shell and door frame greater than 1/4" on sides.

7. Latch: Latch shall be stainless steel, self-locking, with dual latch points. Latch shall secure door automatically when door is pushed against latch from outside the kennel. There shall be nylon bushings on latch for quiet secure operation requiring no lubrication. Latch bar shall be made of 11 gauge stainless steel. A hole shall be provided at bottom of latch bar to allow for additional locking device, such as a padlock.

8. Trim: All trim hardware and screws shall be stainless steel.

9. Sound Deadening: All cages shall include sound deadening patches on 4 sides to reduce unwanted noise from vibration.

2.3 CAGES (FIELD ASSEMBLED)

A. Field-assembled, panel and gate system canine cages shall comply with the following requirements:

1. Gate and Panel Frame Material: 1-1/4" square tube, 18 gauge wall, type 304 stainless steel, with 320 grit finish.

2. Gate Construction: 1-1/4" square tube construction with 1-1/4" square tube horizontal center support. Frame shall be drilled to accept grill rods which shall be inserted into frame for added strength. Grill shall be constructed of 1/4" diameter stainless steel rods, spotwelded at all intersections and tack welded to frame. Grill vertical rods shall be on 1-1/2" centers, with horizontal rods on 6" centers.

3. Panel Construction: Isolation panels (48" high or full isolation) shall be constructed of two (2) sheets of 20 gauge type 304 stainless steel with satin finish.

4. Latch: Latch shall be stainless steel, self-locking, with dual latch points. Latch shall secure door automatically when door is pushed against latch from outside the kennel. There shall be nylon bushings on latch for quiet secure operation requiring no lubrication. Latch bar shall be made of 11 gauge stainless steel. A hole shall be provided at bottom of latch bar to allow for additional locking device, such as a padlock.

5. Trim: All trim hardware and screws shall be stainless steel.

6. Accessory: Stainless steel sloped wedged floor drain cover. Continuous field assembled per manufacturer's standard components.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where cages are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work. Do not mount animal equipment until all plumbing and electrical connections are in place

3.2 INSTALLATION

A. Install animal equipment in accordance with manufacturers' instructions, using fasteners appropriate to substrate and recommended by manufacturer. Install equipment plumb and level, firmly anchored in locations and at heights indicated.

B. Cooperate with other trades for installation of sign units to finish surfaces. Repair or replace damaged units as directed by the Commissioner.

3.3 ADJUSTMENT AND CLEANING

A. Adjust animal equipment for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION

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SECTION 210800

COMMISSIONING OF FIRE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

B. The OPR and BOD documentation are included by reference for information only.

C. Division 01 section 'LEED Requirements' for additional LEED requirements.

1.2 SUMMARY

A. This section includes commissioning process requirements for Fire Suppression systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DESCRIPTION

A. Refer to Division 01 Section "General Commissioning Requirements" for the description of commissioning.

1.4 DEFINITIONS

A. Refer to Division 01 Section "General Commissioning Requirements" for definitions.

1.5 SUBMITTALS

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's role.

B. Refer to Division 01 Section "Submittals" for specific requirements. In addition, provide the following:

C. Certificates of readiness

D. Certificates of completion of installation, prestart, and startup activities.

E. O&M manuals

F. Test reports

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the contractor for the equipment being tested. For example, the fire protection contractor of Division 21 shall ultimately be responsible for all standard testing equipment for the plumbing system in Division 21. A sufficient quantity of two-way radios shall be provided by each subcontractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.

D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the City of New York.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the installing contractors, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems

B. **Red-lined Drawings:** The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. **Operation and Maintenance Data:** Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been mad by the contractor.

D. **Demonstration and Training:** Contractor will provide demonstration and training as required by the specifications. A complete training plan and schedule must be submitted by the contractor to the CxA four weeks (4) prior to any training. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.

B. Attend construction phase coordination meetings.

C. Participate in Fire Suppression systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

D. Provide information requested by the CxA for final commissioning documentation.

E. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.

F. Prepare preliminary schedule for Fire Suppression system orientations and inspections, operation and maintenance manual submissions, training sessions, flushing and cleaning, equipment start-up, and task completion for Commissioner. Distribute preliminary schedule to commissioning team members.

G. Update schedule as required throughout the construction period.

H. Assist the CxA in all verification and functional performance tests.

I. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

J. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.

K. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

L. Participate in, and schedule vendors and contractors to participate in the training sessions.

M. Provide written notification to the CM/GC and CxA that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.

1. Fire Suppression equipment including pumps, piping, and all other equipment furnished under this Division.
2. Automatic sprinkler system.
3. Fire stopping in fire rated construction, including caulking, gasketing and sealing of smoke barriers.

N. The equipment supplier shall document the performance of his equipment.

O. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

P. Equipment Suppliers
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Commissioner, to keep warranties in force.
2. Assist in equipment testing per agreements with contractors.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

Q. Refer to Division 01 Section "General Commissioning Requirements" for additional contractor responsibilities.

3.3 COMMISSIONER'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Commissioner's Responsibilities.

3.4 DESIGN PROFESSIONAL'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Design Professional's Responsibilities.

3.5 CxA'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's Responsibilities.

3.6 TESTING PREPARATION

A. Certify in writing to the CxA that Fire Suppression systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that Fire Suppression instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

D. Inspect and verify the position of each device and interlock identified on checklists.

E. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

F. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.7 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of Fire Protection testing shall include entire Fire Suppression installation. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions.

D. The CxA along with the Fire Suppression contractor shall prepare detailed testing plans, procedures, and checklists for Fire Suppression systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the Fire Suppression system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.8 FIRE SUPPRESSION SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. **Equipment Testing and Acceptance Procedures:** Testing requirements are specified in individual Division 21 sections. Provide submittals, test data, inspector record, and certifications to the CxA.

B. **Fire Suppression Distribution System Testing:** Provide technicians, instrumentation, tools, and equipment to test performance of sprinkler distribution systems.

C. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:

1. Sprinkler System

3.9 DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.

3.10 APPROVAL

A. Refer to Division 01 Section "General Commissioning Requirements" for approval procedures.

3.11 DEFERRED TESTING

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deferred testing.

3.12 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.

B. Refer to Division 01 Section "General Commissioning Requirements" for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.13 TRAINING OF CITY OF NEW YORK PERSONNEL

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to training.

END OF SECTION 210800

SECTION 211000
FIRE SUPRESSION SYSTEM

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 City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2 DESCRIPTION

A. This Section specifies requirements of piping and appurtenances for automatic sprinkler fire protection systems. The work of this section includes, but is not limited to, the following:

B. Wet-Pipe System.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. General Conditions – Section 01000

B. Addendum to General Conditions

C. Section 230500 – Common Work Results for Mechanical.

D. Section 230548 – Vibration, Noise Control and Seismic Control for Plumbing Piping and Equipment.

E. Section 230553- Mechanical Identification.

1.4 SUBMITTALS

A. Submittals shall be provided in accordance with Section 220500 – Common Work Results for Plumbing.

PART 2 - PRODUCTS

2.1 PIPE, FITTINGS, AND FLANGES

A. Provide pipe, fittings, and flanges in accordance with the "PIPE, FITTINGS, AND FLANGES SCHEDULE" specified below, including gaskets, bolts, nuts, washers and other pressure containing parts necessary for the complete installation of piping systems.

B. Nipples shall be extra-heavy shoulder types of same material as pipe; close nipples are not acceptable.

C. Unless otherwise shown on the Contract Drawings, piping connections to equipment shall be made up with unions for piping 2 inches and smaller and shall be flanged for piping 2 1/2 inches and larger.

D. Gasket for flanges shall be 1/16-inch thick (after compression), rubber or neoprene, full-faced, and punched bolt holes.

E. Provide insulating flanges, couplings or unions where brass or copper pipe connects to ferrous pipe material. Flanged connections shall be made with gaskets, sleeves and washers of dielectric material for complete insulation between flanges, bolts, nuts and washers.

F. Grooved Piping Mechanical Couplings

1. Couplings shall be complete with gaskets, bolts and nuts recommended by the manufacturer for the service. Use vandalproof nuts and bolts on vertical piping in stairs.

2. Couplings shall be Victaulic "Style 07", or approved equal.

3. Couplings shall be manufactured by Victaulic Co. of America, Grinnell Corporation, Gustin-Bacon Division, or approved equal.

PIPE, FITTINGS AND FLANGES SCHEDULE		
SYSTEMS	PIPE	FITTINGS AND FLANGES

Wet-Pipe, Above Ground	Black Steel, ASTM A795 or A53, Schedule 40	Cast Steel, ANSI B16.4 or Malleable Iron, ANSI B16.3, 175 psi w.w.p,, Threaded Companion Flanges, Cast Iron, ANSI B16.1, 125 lb. Class Ductile Iron, ASTM A 536, Mechanical Type Couplings & Gaskets
Underground piping and Piping between Siamese Connection and Check Valve.	UL Listed, Cement Mortar Lined ductile Iron Pipes and Fittings, AWWA C104, AWWA C110, AWWA C111.	UL Listed, Cement Mortar Lined ductile Iron Pipes and Fittings, AWWA C104, AWWA C110, AWWA C111.
Drain Piping	Galvanized Steel, ASTM A53, Schedule 40	Galvanized Cast Iron, ANSI B16.4, 125 lb. Class, Threaded

2.2 VALVES

A. Control Valves

1. Valves

a. All valves shall be UL listed

b. Valves shall be OS&Y, solid wedge gate valves with rising stem and wheel handles, rated for 175 psi w.w.p. Valves shall have gland followers in stuffing box and shall be repackable while open and under pressure.

c. Each valve shall be stamped with manufacturer's name and working pressure of the valve.

d. All control valves shall be provided with a tamper switches, prepare valve stem as required to accept tamper switches.

e. Valves, 2 inches and smaller, shall be threaded, bronze body.

f. Valves, 2 1/2 inches and larger, shall be flanged, iron body,

g. Valves shall be manufactured by Crane Co., Grinnel Corp., Stockham Valves & Fittings, or approved equal.

2. Tamper Switches

a. Provide tamper switches in accordance with manufacturer's

recommendations.

b. Tamper switches shall monitor the control valves to detect and indicate when a valve has been closed.

c. Unless otherwise shown on the Contract Drawings, tamper switches shall be completely factory assembled and wired and shall be mounted on the control valve. The valve stem shall be prepared as required to accept the actuating roller rod. Switches shall be Potter Electrical Signal Co. Model OSYSU-1 or OSYSU-2, or approved equal.

d. Wiring to control circuit shall be as specified in Division 26.

e. Tamper switches shall be manufactured by Potter Electrical Signal Co., Acme Fire Alarm Co. Inc, Fire Control Instruments Inc., or approved equal.

B. Drain and Test Valves

1. Valves shall be threaded, bronze, angle or globe type with composition disc, 175 psi w.w.p.

2. At system low points where drain piping does not extend to a drain receptacle, provide a threaded hose end adapter at the valve outlet.

3. For dry-pipe systems, provide drum-drip drains on all low points in the systems.

4. Valves shall be manufactured by Crane Co., Grinnel Corp., Stockham Valves & Fittings, or approved equal.

C. Check Valves

1. Check valves shall be UL approved iron body. Check valves shall be swing types with renewable composition disc, bronze seat ring, and bolted cover.

2. Valves, 2 inches and smaller, shall be threaded, bronze, 175 psi w.w.p.

3. Valves, 2 ½" inches and larger, shall be flanged, iron body, 175 psi w.w.p. unless otherwise shown on the Contract Drawings.

4. Check valve on pump discharge shall be flanged flat type UL approved cast iron or cast steel bronze with stainless steel spring, bronze or stainless steel disc and seal ring, silent check valve rated for 300 psi w.w.p.

5. Valves shall be manufactured by Crane Co., Grinnell Corp., Stockham Valve & Fittings, or approved equal

2.3 ALARM CHECK VALVE

A. General:

1. Size of automatic valve shall be at least as large as the system riser and related to system demand and friction loss limitations in hydraulically designed systems.

2. Automatic valves shall be manufactured by Reliable Automatic Sprinkler Co. Inc., Star Sprinkler Corp., Viking Corp., or approved equal.

B. Provide where indicated on the drawing UL listed and FM approved alarm check valve complete with all trimmings including but not limited to piping, fittings, valves, check valves, restriction assembly, electric alarm switch, pressure gages, etc.

1. Size of valve shall be as required by system size, system demand and friction loss limitations.

2. Alarm check valve assembly shall be Tyco Model AV-1-300 or approved equal.

3. Retard Chamber shall be Tyco Model RC-1 or approved equal.

2.3 SIAMESE CONNECTIONS

A. Free standing type Siamese connection shall be have two-way clapper cast iron angle body, 24" long polished chrome plated cover sleeve, polished chrome plated identification base plate, Potter-Roemer Series 5762, MEA No. 493-06-E, or approved equal.

B. Size and location of outlet shall be as shown on the Contract Drawings.

C. Lettering on a based plate shall be "Auto. Spkr."

D. Siamese connection shall be provided with two polished brass double female snoots with rigid end NPT x pin lug hose thread swivels with cast iron breakable green caps.

E. Threads shall be N.Y.F.D.

2.4 SPRINKLER HEADS

A. Sprinkler heads shall be quick response type, have 1/2-inch orifice and ordinary temperature rating (160-165 degrees F), unless otherwise specified below or shown on the Contract Drawings.

B. Sprinkler heads in areas without hung ceiling shall be bronze, upright or pendent type with chrome finish.

C. Sprinkler heads in hung ceilings, where shown on the Contract Drawings, shall be chrome-plated, concealed type. Provide chrome plated cover. Submit cover sample to the Architect or Engineer for review.

D. Sprinkler heads shall be manufactured by Reliable, Tyco, Viking or approved equal.

2.5 ACCESSORIES

A. Automatic Ball Drips

1. For each siamese connection provide a Potter-Roemer Model 5982 automatic ball drip, or approved equal. Provide pipe discharge to exterior or to pit as indicated on contract drawings. Where static pressure at location requiring drainage exceeds the ball drip operating characteristics, a valved drain shall be used.

B. Pressure Gauges

1. Gauges shall have cast iron case, 4 1/2-inch diameter aluminum ring-bronze bourdon tube, all brass linkage, 1/2-inch bottom connection, black pointer, white face with black figures and segment range of 0-250 psi, 20 psi figure intervals, 2 psi intermediate graduations. Dial shall have red marker at 175 psi. Gauges shall be Dresser Industries Inc. "Ashcroft Series 1379", or approved equal.

C. Sight Glass

1. Where test connections connect to closed drains or spill to receptacles located remotely from test control valves, a sight test connection, having a smooth bore noncorrosive orifice giving a flow equivalent to one sprinkler, shall be provided.

2. Where sprinkler drain lines connect to closed drain lines or spill to receptacles located remotely from drain valve, a glass sight drain shall be provided.

D. Pipe and Valve Identification

1. Pipe and valve identification shall be in accordance with the requirements specified under division 23.

2. Identification Signs

a. Provide identification signs for all control valves, test valves, and system drain valves in accordance with NFPA 13. Identification signs shall be

Reliable Style A and B, or approved equal.

b. On the outside of doors to rooms where control valves are located, provide suitable signs making note of such valve locations.

c. For hydraulically designed systems, a hydraulic calculation data sign shall be mounted at the system control valve assembly. The sign shall contain such data as design density, designed area of discharge, discharge rate, residual pressure available and pressure required.

E. Access Ladders

1. Control valves located seven feet or more above the finished floor shall be provided with a permanent steel access ladder. Access ladders shall be furnished and installed under other sections.

F. Access Doors

1. Provide a complete list of all access doors required in finished walls, ceilings, partitions, and any other area for access to all valves, waterflow alarms, flushing connections, drains, etc., concealed behind such finished constructio0n. Access doors shall be furnished and installed under other Sections.

2.6 PIPE HANGERS AND SUPPORTS

A. Design, fabricate and provide all pipe hangers and supports adequate to support and guide the piping, allow for forces imposed by expansion joints, satisfy structural requirements and maintain proper clearances with respect to adjacent piping, equipment and structures

B. Provide hangers and supports, with beam clamps, restraints, supplemental steel, inserts, fish plates, mounting devices, and similar items to support piping in alignment without sagging or interference, and to permit complete drainage and free expansion and contraction. Provide retaining straps when installing beam clamps or C clamps.

C. All hangers and supports shall be capable of screw adjustment after piping is erected and shall be provided with a locking nut (double nut) to prevent loss of adjustment.

D. Where required, provide anchors, sway bracing, blocking and steel to connect to structure to prevent excessive pipe movement that could cause damage due to expansion, contraction or thrust.

E. All pipe hangers, supports, supplemental steel rods, and components shall be galvanized.

F. Pipe hanger spacing, rod diameter, etc. shall be in accordance with the requirements

of NFPA 13.

G. Support hangers from building steel framing wherever possible. Provide any additional miscellaneous steel supports between framing members as required. Do not support piping from other piping, ductwork and conduit.

H. Tabs in metal deck construction shall not be used to support piping.

I. Perforated band iron, strap iron or wire are not acceptable materials to be used and will not be approved.

J. Where required, provide supplemental channels and steel to support Work specified in this Section. Cut ends of steel shall be ground smooth, free from burrs and sprayed with a galvanized coating.

K. Where several pipes rest on a common trapeze, increase hanger rod diameter and decrease spacing in accordance with maximum and minimum pipe sizes, respectively.

L. Expansion anchors, self-drilling expansion shields, power driven studs and similar devices shall not be used, unless specifically approved by the Engineer.

M. Provide pipe restraints to prevent movement by an upward thrust in the pipe risers.

N. Support vertical piping at the lowest level, at each alternate level above and below offsets, and at the top of the riser by use of riser clamps. Provide additional intermediate support brackets, secured to structure, on piping utilizing gasket coupling joints

O. Support horizontal piping as follows:

1. For piping 3 inches and smaller, support on adjustable swivel pipe rings or clevis type hangers.

2. For piping sizes of 4 to 6 inches, support on clevis type hangers.

P. Hanger system shall not penetrate waterproofing.

Q. If removal of fireproofing is required for installation purposes; such removal shall be performed by the Contractor and shall be kept to a minimum. The Contractor shall replace all removed fireproofing with new fireproofing to the satisfaction of the Engineer at no additional cost to the City of New York.

R. Unless otherwise specifically approved, hanger rod size and spacing shall be within the following limits:

Pipe Size	Maximum Hangar Spacing	Minimum Rod Size

1" to 2"	12 ft. o.c.	3/8"
2 1/2" to 3 1/2"	12 ft. o.c.	1/2"
4" and 5"	12 ft. o.c.	5/8"
6"	12 ft. o.c.	3/4"

S. Provide thrust restraint on underground piping entering the building through the floor or wall and to sprinkler siamese connections.

T. Provide sway bracing in addition to required pipe hangers to maintain pipe alignment and comply with seismic restraints.

U. Hangers and supports shall be manufactured by Grinnell Corp., Carpenter & Patterson Inc., Michigan Hanger Co. Inc., or approved equal.

2.7 SLEEVES, SEALS, AND ESCUTCHEONS

A. Piping passing through masonry or concrete walls and framed partitions shall have a trim opening cut no greater than necessary for the installation of a sleeve secured therein. Sleeve shall be 1/2 inch in diameter larger than the outside diameter of the pipe. Sleeve shall be flush with the finished wall or partition surface.

B. Sleeves through concrete floors for piping shall have the opening 1/2 inch in diameter larger than the outside diameter of the pipe passing through. Floor sleeves shall project one inch above floor slab.

C. Annular spaces between piping and sleeves shall be packed with mineral wool and sealed to retain the fire integrity of the walls, partitions, and floors with a nonhardening compound of Manville Corp., "Uniseal" or "Duxseal", or approved equal.

D. Sleeves in walls and floors shall be galvanized steel pipe, Schedule 40 for sizes up to 10 inches and 3/8-inch wall thickness for 12 inches and larger. Sleeves in partitions shall be 20-gauge galvanized sheet metal.

E. Piping in exposed areas, passing through walls, floors or ceilings shall be fitted with chromium-plated cast brass escutcheons with fastening set screws.

F. Piping passing through floor waterproofing membrane shall be provided with a 4-pound lead flashing or a 16-ounce copper flashing, each within an integral skirt or flange. Flashing shall be suitably formed, and the skirt or flange shall extend not less than 8 inches from the pipe and shall be set over the floor membrane in a solid coating of bituminous cement. The flashing shall extend up the pipe a minimum of 10 inches above the floor. The annular space between the flashing and the pipe shall be sealed watertight.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Install piping and appurtenances in accordance with manufacturers' installation procedures, requirements of NYC Building Code Section 9 and Appendix Q and as specified.

2. Coordinate piping installation with other Work to avoid interference. Coordinate as necessary to ensure that all hangers, supports, sleeves and other built-in devices are incorporated in forms or in masonry to avoid necessity of cutting finished structure

3. All measurements, both horizontal and vertical, shall be based on established bench marks. All Work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the Work

4. Perform necessary cutting and patching in accordance with requirements specified in the Section 230500 basic mechanical. All openings in slabs required for pipe penetrations shall be core drilled.

5. All remote field addressee interface devices shall be installed within a NEMA rated enclosure suitable to the environment in which it is installed. It shall be adequate size to provide room ease working and maintaining

6. Electrical installation of appurtenances furnished under this Section shall be in accordance with requirements specified under Division 26

7. Installation requirements for pipe hangers and supports and pipe penetration sleeves, seals, and escutcheons are specified in 2.12 and 2.13, respectively.

8. Sprinklers are required to be installed in center of ceiling tile. Contractor to provide necessary offsets to assure this installation.

B. Piping

1. Install piping as shown on the Contract Drawings and straight and direct as possible, forming right angles or parallel lines with building walls, neatly spaced, with risers plumb and true.

2. Sprinkler piping shall be installed so that the system can be drained.

3. Avoid tool marks and unnecessary pipe threads. Burrs formed when cutting pipe shall be removed by reaming. Before installing pipe, thoroughly clean the inside free of cutting and foreign matter. Cut all pipes square and smooth and

make up all joints to required limits.

4. Make changes in pipe size by the use of reducing fittings. Do not use reducing bushings except by approval of the Engineer.

5. Provide auxilary drains for trapped sections of piping in accordance with NFPA 13 requirements.

6. Provide protective pans under pipes passing over high voltage electric bus duct or switchgear equipment. Construct the pans of 18-gauge copper, suitably reinforced to prevent sagging. Turn the edges of the pans up to 6 inches on all sides with corners brazed to make the pans watertight. Support the pan with hangers and provide drainage clear of the electrical work.

7. Provide additional sprinklers in accordance with NFPA-13 to clear obstructions course by ducts, piping, baggage conveyers, light fixtures, beams, etc.

8. Ductwork or other obstructions greater than four (4) feet in width in areas without hung ceilings, and required to be sprinklered, shall be provided with sprinklers above and below the obstructions.

9. The sprinkler systems shall be installed so that no part thereof will interfere with doors, windows, heating, plumbing or electrical equipment. Coordinate work with the other sections to avoid any interference with potential effectiveness of the Automatic Spinkler Systems. When ductwork is relocated for coordination and now interferes with the sprinkler design, provide any additional sprinkler heads, and piping without charge to the City of New York. The Architectural, Mechanical, Plumbing and Electrical plans shall be examined in detail and conditions relative to the installation of piping, particularly when concealed behind furring or above hung ceiling.

10. Provide flushing connections for flushing scale and foreign material from sprinkler system in accordance with NFPA 13

11. Install "Inspector's Test Connections" in sprinkler piping located at the remote end of each sprinkler system on the top floor. Complete inspection test connections with shutoff valve, sized according to NFPA-13.

12. Before final piping connections are made to equipment and before sprinkler heads are installed, all piping shall be thoroughly blown out, rodded out, or washed out at least twice, in a manner as directed and approved by the Engineer, to remove all accumulation of dirt, chips or other deleterious materials. Make all temporary connections and furnish all appliances required for the purpose of cleaning

13. Drawings are generally diagrammatic, and all required offsets, piping, fittings, valves, drains, etc., may not be shown but shall be provided in accordance with

NFPA and the Building Code.

14. Provide sufficient elbows, swings and offsets to permit free expansion and contraction.

C. Pipe Joints

1. Threaded joints shall be made up tight using pipe joint Teflon compound or tape, applied on the male threads only.

2. Roll-grooved pipe and fittings shall be clean and free from indentations, projections and tool marks in the area from pipe end to groove for proper gasket sealing. Provide a thin uniform coat of lubricant on the suitable gasket intended for specified service as recommended by the manufacturer. Place the gasket over one pipe end, align pipe ends and bring together, positioning the gasket between the groove on each pipe end. Assemble the housing over the gasket with housing key section engaging both grooves. The bolts shall be inserted, nuts started and uniformly tightened until the housing bolt pads are firmly seated together, metal to metal

3. Flanged joints shall be made up square and tight with gaskets. Dip bolts and nuts in mixture of graphite and oil immediately prior to installation.

4. Joints between copper or brass and steel pipe shall be made by using a dielectric coupling.

3.2 FIELD TESTS

A. Notify the Engineer and those authorities which have jurisdiction, at least 48 hours in advance of making the required tests, so that arrangements may be made for their presence to witness the tests.

B. Perform all tests prior to painting or concealing.

C. Isolate all equipment, controls and instruments from the piping system during the required tests.

D. Provide and install necessary equipment, instruments, hardware, temporary piping, vents, drains, and includes necessary personnel required to perform all tests.

F. Perform hydrostatic tests for all sections of the piping systems installed under this Section, at not less than 200 psi pressure for two hours, or at 50 psi in excess of the maximum pressure, when the maximum pressure to be maintained in the system is in excess of 150 psi. The test pressure shall be read from a gauge located at the low elevation point of the individual system or portion of the system being tested.

H. Systems may be tested in sections, when directed by the Engineer, to permit

construction to proceed. Testing on a section-by-section basis may be done with standard air pressure test. When the sprinkler system is completely installed, it shall be subjected to the hydrostatic test herein specified.

I. Test all components in the system including alarm devices and demonstrate that the equipment complies with the requirements and function for which they are intended. Testing through the Inspector's Test Connection shall be included to demonstrate that flow and time parameters are satisfied.

J. With the entire system under normal operating pressure, each control valve shall be opened and closed to demonstrate proper operation.

K. All tests shall conform to the requirements of NFPA 13. Records of all tests shall be made available for the Engineer's inspection, as required.

L. Should the tests reveal any leaks or deficiencies in piping installed under this Section, make necessary corrections immediately and flush, clean and retest the system for the Engineer's approval at no cost to the City of New York.

M. Repair or replace any portion of the system installed under this Section that is damaged as a result of test operations at no cost to the City of New York.

N. Dispose of water removed from pipelines in a manner that shall not cause damage to any property

P. The sprinkler system waterflow alarm switches shall be tested by flowing water. The sprinkler system valve tamper switches shall be tested by closing sprinkler valves.

3.3 PROTECTION

A. As soon as sprinkler heads are in place, cover each head with a small paper bag of an UL-approved type which shall be removed only after all painting is complete and then all heads shall be cleaned.

3.4 PAINTING

A. Upon completion of the installation, remove all protecting materials, thoroughly remove all scale and grease and leave in a clean condition for painting. Painting is specified in other Sections of the Specifications.

3.5 PIPE AND VALVE IDENTIFICATION

A. Pipe and valve identification shall be installed in accordance with the requirements

specified in Section 230553 basic mechanical requirements.

END OF SECTION

SECTION 22 0500

COMMON WORK RESULTS FOR PLUMBING

PART 1 GENERAL

1.1 DESCRIPTION

A. The requirements of this Section apply to all the Work of Division 22 0000.

B. Provide a complete working installation with all equipment called for in proper operating condition. Documents do not undertake to show or list every item to be provided. When an item not shown or listed, is clearly necessary for proper operation of equipment which is shown or listed, provide an item which will allow the system to function properly at no increase in Contract Sum.

C. The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content;use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

D. Coordinate requirements of following related sections

1. General Conditions – Section 01000

2. Addendum to General Conditions

E. The scope of work includes:

1. Hoisting and rigging required to complete work of this section.

2. Vibration isolation.

3. Provide complete domestic water system including but not limited to water meter, backflow preventers, hot ware heater, expansion tank, piping, valves, fittings and other hardware.

4. Provide complete sanitary system including but not limited to sewage ejectors and control, floor drains, waste and vent piping.

5. Provide complete storm water system including but not limited to roof and area drains, storm water piping, storm water pumps and control.

6. Provide complete natural gas system including but not limited to gas pressure regulator, gas meter, gas valves and piping.

7. Plumbing fixtures and faucets.

8. Insulation

9. Identification

10. Cleaning and prime painting.

11. Instruction manual and start up instructions.

12. Testing and balancing.

13. Commissioning.

F. Related work specified elsewhere: The following work, unless otherwise noted is not included in this section shall be performed in other sections:

1. Electric power wiring for all equipment. See division 26.

2. Provision for circuit breakers, testing and connections for DDC control power wiring.

3. Excavation and backfill.

4. Concrete work, including concrete housekeeping pads and other pads and blocks for vibrating and rotating equipment, ductbank envelopes and cast in place manholes and handholes, except as part of an inertia base. See Division 3

5. Cutting and patching of masonry, concrete, tile and other parts of structure, with the exception of drilling for hangers and providing holes and openings in metal deck.

6. Flashing of wall and roof penetrations.

7. Installation of access panels in floors, walls, furred spaces or above ceilings

8. Structural supports necessary to distribute loading from equipment to roof or floor , except as specified herein.

9. Thermal and sound insulation in partitions and ceilings.

1.2 QUALITY ASSURANCE

A. General:

1. All equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

2. All equipment and accessories new, free from defects.

3. Supply all equipment and accessories in compliance with the applicable standards listed in this Section and with all applicable national, state and local codes.

4. All items of a given type shall be the product of the same manufacturer.

5. Install work by craftsmen skilled in trade involved and by apprentices as indicated in the general conditions.

B. Requirement of regulatory agencies:

1. In accordance with requirements of General Conditions Section 01000 and Addendum to general Conditions and as specified herein.
2. Nothing in the Drawings or Specifications shall be construed to permit Work not conforming to applicable laws, ordinances, rules or regulations.
3. When Drawings or Specifications exceed requirements of applicable laws, ordinances, rules or regulations, Drawings and Specifications take precedence.
4. It is not the intent of Drawings and Specifications to repeat requirements of codes except where necessary for completeness or clarity.
5. If any of the requirements of the above are in conflict with one another, or with the requirements of this specification, the most stringent requirements shall govern.
6. New York City Building Code.

C. Materials and equipment shall be manufactured, installed and tested as specified in latest editions of applicable publications, standards, rulings and determinations of:

1. Local and state building, plumbing, mechanical, electrical, fire and health department codes.
2. International Plumbing Code 1996 Edition
3. American Gas Association (AGA).
4. National Fire Protection Association (NFPA).
5. American Insurance Association (AIA) (formerly National Board of Fire Underwriters).
6. Occupational Safety and Health Act (OSHA)
7. Underwriter's Laboratories (UL).
8. Factory Mutual Association (FM).
9. National Electric Code (NEC)
10. Environmental Protection Agency (EPA)
11. National Bureau of Standards (NBS)
12. City of New York's Insurance Underwriter.

D. All materials and equipment shall be listed by Underwriters" Laboratories (UL), and approved by ASME, ANSI, ASTM, AGA, and NEC for intended service.

E. Most recent editions of applicable specifications and publications of the following organizations form part of these Contract Documents.

1. American National Standards Institute (ANSI)
2. American Society of Mechanical Engineers (ASME)

3. National Electrical Manufacturers' Association (NEMA)
4. American Society for Testing and Materials (ASTM)
5. American Water Works Association (AWWA)
6. Plumbing and Drainage Institute (PDI)
7. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
8. Hydraulic Institute (HI)
9. Thermal Insulation Manufacturers Association (TIMA)
10. A13.1 Scheme for Identification of Piping Systems
11. Manufacturers Standardization Society of the Valves & Fittings Industry (MSS)
12. Adhesive and Sealant Council (ASC)
13. American Society of Sanitary Engineering (ASSE)

F. Specific reference is made to following NFPA codes which contain an exceptionally high quantity of mechanical, electrical, and fire protection requirements.

1. No. 13- Installation of sprinkler systems
2. No. 70- National Electric Code
3. No. 72E- Automatic Fire Detectors

1.3 DEFINITIONS

1. "Provide" means "furnish and install", complete, the specified material, equipment or other item and perform all required labor to make a finished installation.
2. "Furnish" means to purchase and deliver to project site complete with all appurtenance and support. "Install" means to unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project
3. "Trade Contractor" or "TC" means the trade contractor responsible for the work in this Division of the specification.
4. "RFI" means "Contractor's Request for Information".
5. Reference by abbreviation may be made in the specifications and the Contract Drawings for Mechanical and Electrical Work in accordance with the following list:

HVAC	Heating, Ventilating and Air Conditioning
GC	General Contractor
AC	Air Conditioning
H&V	Heating and Ventilating
AWG	American Wire Gauge

BWG	Birmingham Wire Gauge
USS	United States Standards
B&S	Brown and Sharpe
OS&Y	Outside Screw and Yoke
IBBM	Iron Body Brass Mounted
WSP	Working Steam Pressure
PSIG	Pounds Per Square Inch
PRV	Pressure Reducing Valve
GPM	Gallons Per Minute
MBH	Thousand BTU per Hour
BTU	British Thermal Units
WG	Water Gage
LB	Pound (Also shown as: #)
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
ABMA	American Boiler Manufacturer's Association
ASA	American Standards Association

1.4 SCOPE

A. Perform work and provide material and equipment as shown on the drawings and/or as specified and/or as indicated in this section of the specifications. Completely coordinate all work of this section with work of other trades and provide a complete and fully functional installation

B. Drawings and Specifications form complimentary requirements; provide work specified and not shown, and work shown and not specified as though explicitly require by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for sound, secure and complete installation.

C. Give notices, file plans, obtain permits and licenses, pay fees and back-charges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of Contract Documents

1.5 CONTRACT DOCUMENTS

A. Listing of Documents does not limit responsibility of determining full extent of work required by these Contract Documents. Refer to Architectural, HVAC, Electrical, Structural, Site Utility and all other drawings and other sections that types of construction in which work shall be installed and work of other trades with which work of this section must be coordinated

B. Except where modified by a specific notation to the contrary; it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

C. Items referred to in singular number in Contract Documents shall be provided in quantities necessary to complete work.

D. Drawings are diagrammatic. They are not intended to be absolutely precise; they are not intended to specify every offset, fitting and component. The purpose of the document is to indicate systems concept, the main components of the systems, and the approximate geometric relationships. Based on the systems concept, the main components and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational

E. Information and components shown on riser diagrams, but not shown on plans, and vice versa, shall apply and be provided as if expressly required on both

F. Data that may be furnished electronically by the Commissioner (on compact disk, diskette, or otherwise) is diagrammatic. Such electronically furnished information is subject to the same limitation of precision as heretofore described. If furnished, such data is for convenience and generalized reference, and shall not be substitute for Commissioner's sealed or stamped construction documents.

1.6 REVIEW OF CONTRACT DOCUMENTS AND SITE

A. With the submission of his bid, Contractor shall give written notice to the Commissioner of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules or regulations of Authorities having jurisdiction, and any necessary items of work omitted. In the absence of such written notice it is mutually agreed that the Contractor has included the cost of all required items in his proposal for a complete project.

B. Contractor shall acknowledge that he has examined the Plans, Specifications and Site, and from his own investigations he has satisfied himself as to the nature and location of the work; the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials; availability of labor, water, electric power, roads and uncertainties of weather; the conformation and condition of the ground; the character, quality and quantity of surface and subsurface materials to be encountered; the character of equipment and facilities needed preliminary to and during the execution of the work; all federal, state, county, township and municipal laws, ordinances and regulations particularly those relating to employment of labor, rates of wages, and construction methods; and all other matters which can in any way affect work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with the available information concerning these conditions will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work.

C. The location and elevation of the underground utilities, such as sewers, electrical power, water piping, steam and steam condensate return piping, conduit, etc., is as exact as can be determined from available information and its accuracy cannot be guaranteed. Exact location and elevation of these services shall be verified prior to excavation or installation of any portion of the work indicated. Exercise special care when excavating at or near

the general location of underground utilities to avoid damage to the utility services. The Contractors is responsible to insure worker safety.

D. The contractor shall also acknowledge to have visit site and examined conditions under which work must be performed including preparatory work done under other Sections or other Contracts or by the Commissioner. Report conditions to Commissioner. Do not proceed until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing conditions and preparatory work.

1.7 PHASING

A. Work is to be completed in distinct phases if so indicated on bid documents.

1.8 DISCREPANCIES IN DOCUMENTS

A. Where Drawings or Specifications conflict or are unclear, advice Commissioner in writing before award of Contract. Otherwise, Commissioner's interpretation of the Contract documents shall be final, and no additional compensation shall be permitted due to discrepancies or unclarities thus resolved.

B. Where Drawings or Specifications do not coincide with manufacturer's recommendations, or with applicable codes and standards, alert Commissioner in writing before installation. Otherwise, make changes in installed work as Commissioner requires within Contract Price.

C. If the required material, installation, or work can be interpreted differently from drawing to drawing, or between drawings and specification, this contractor shall provide material, installation, or work which is of higher standard.

D. It is the requirement of these documents to have contractor provide systems and components that are fully complete and fully operational and fully suitable for intended use. There may be situations in the documents where insufficient information exists to precisely describe a certain component or subsystem, or the routing of the component or its coordination with other building elements. In cases such as this, where the contractor has failed to notify the Commissioner of the situation in accordance with paragraph (A) above, the contractor shall provide specific component or subsystem with all parts necessary for the intended use, fully complete and operational, and installed in workmanlike manner either concealed or exposed per the design intent.

E. In cases covered by paragraph (D) above, where the contractor believes he needs the engineering guidance, he shall submit a sketch identifying his proposed solution and the Commissioner shall review, note if necessary, and approve the sketch.

1.9 MODIFICATIONS IN LAYOUT

A. HVAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show exact routings and locations needed to coordinate with structure and other trades to meet Architectural requirements

B. In order to obtain the Architects desired aesthetics in spaces used by building occupants, in all such spaces, prior to installation of visible materials, finishes and equipment

(including access panels, review Architectural Drawings for desired locations and where not definitely indicated, request information from the Commissioner

C. Check Contract Drawings, as well as Shop Drawings, of all subcontractors to verify and coordinate spaces in which work of this section will be installed

D. Maintain maximum headroom at all locations. All piping, duct conduit, and associated components to be as tight to underside of structure as possible.

E. Make reasonable modifications in layout and components to prevent conflict with work of other trades and to coordinate according to Paragraphs A,B,C,D above. Systems shall be run in a rectilinear fashion.

F. Where conflicts or potential conflict exists and engineering guidance is desired, submit sketch of proposed resolution to Commissioner for review and approval.

1.10 RFI'S

A. If the RFI is a request to resolve a conflict or an clarification, or a request for additional detail, Contractor's RFI shall include a sketch or equivalent description of Contractor's proposed solution, in accordance with paragraph 1.9(E) and 1.9(F) above

1.11 PROJECT COMMUNICATION

A. Communication and Submittals:

1. The specification references communication and submittal of information and documents by the Trade Contractor to the Commissioner. In all cases such communication shall be submitted to the Commissioner who will review it before forwarding to the relevant party for review and response.

2. If the information provided is not in conformance with the specification the Commissioner shall return it to the relevant Trade Contractor for re-submission.

3. The time taken for this process shall be factored into all work schedules and submissions.

1.12 MEASUREMENTS

A. Contractor shall base all his measurements, both horizontal and vertical from established benchmark. All work shall agree with these established lines and levels. He shall verify all measurements at site; and check the correctness of same as related to the work.

1.13 SPECIAL STATUS

A. The project is targeted to meet LEED Certification or higher.

1.14 MATERIALS AND WORKMANSHIP

A. Materials shall be new, meet detailed requirements of the Contract Documents and be identifiable as being specified or substitute products.

B. Materials which do not conform to the requirements of the Contract Documents, are not equal to approved samples or are unsatisfactory or unsuited to the purpose for which they are intended, will be rejected.

C. All work shall be performed in the best and most workmanlike manner by plumbers and mechanics skilled in their respective trades and properly licensed.

D. All equipment shall be installed in accordance with the recommendation of the manufacturer.

E. Defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or other cause shall be removed within ten (10) days after written notice is given by the Commissioner and the work shall be re-executed by the Trade Contractor. The fact that the Commissioner may have previously overlooked such defective work shall not constitute total or partial acceptance of it.

F. In no case shall a Bidder base his bid on a class of material or workmanship less than that required by the contract documents nor the governing codes and ordinances.

1.15 CHECKING AND TESTING EQUIPMENT BY TRADE CONTRACTORS AND MANUFACTURER'S REPRESENTATIVE

A. All equipment shall be installed in strict accordance with manufacturer's instructions. During construction request supervisory assistance from equipment manufacturer's representatives so the equipment will be correctly installed. After installation, request the Commissioner to inspect and see the equipment is in proper working order.

B. Manufacturer's representative shall review the overall system design relative to the proper application of his equipment in the particular system. He shall note conduit, wiring, control, location, and other relevant relationships, and furnish appurtenances necessary for satisfactory operation.

C. Before final payment is issued the following shall be complete:

D. The Contractor's representative shall submit to the Commissioner a signed statement certifying:

1. The equipment is properly installed and ready for operation

2. The S.I. Animal Shelter maintenance representatives have been thoroughly trained

3. Maintenance and operation manuals issued and accepted by the Commissioner

1.16 TEMPORARY FACILITIES

A. Temporary Heating: Temporary heating shall be as specified in Addendum to General Conditions

B. Temporary Light and Power: Provided under Division 26.

C. All temporary facilities shall be removed at completion of project.

D. Temporary Water: Temporary water outlets shall be as listed in construction manager's bid package.

1.17 COORDINATION DRAWINGS

A. Distribution of Coordination Drawings:

1. The Sheet Metal Subcontractor shall provide the distribution as outlined in General Conditions Section 01000 or as a minimum

   a. One sepia of each Coordination Drawing to each specialty trade and affected Contractor for their use.

   b. One Mylar of each Coordination drawing to Commissioner.

   c. One sepia of each coordination drawing to the General Contractor/Construction Manager.

B. ALL FIREWALLS AND SMOKE PARTITIONS SHALL BE HIGHLIGHTED ON COORDINATION DRAWINGS FOR APPROPRIATE COORDINATION.

C. The main paths of egress and for equipment removal from main mechanical and electrical rooms must be clearly shown on coordination drawings.

D. Coordination Drawings shall include, but not limited to:

1. Plumbing systems, piping and equipment.
2. HVAC piping, systems and equipment.
3. Control systems.
4. Electrical distribution, systems and equipment.
5. Lighting systems and fixtures.
6. Sheet metal work, components and accessories, costs and boxes in terminals, etc.
7. Fire protection and sprinkler system, piping and heads.
8. Structural.
9. Electrical Equipment Room layouts.
10. Environmental Rooms and associated refrigeration/heating systems.
11. Partition/room layout.
12. Ceiling tile and grid.
13. Access panels.
14. Smoke and fire dampers.
15. Roof drain piping.
16. Major electrical conduit runs, panelboards, feeder conduit and racks of branch conduit.
17. Above ceiling miscellaneous metal.
18. Heat tracing of piping.
19. Minimum access space requirements for all equipment for both installation and maintenance.

1.18 REGULATIONS, CODES, PERMITS, AND FEES

A. Conform to all rules, regulations, standards, ordinances and laws of local, state, and Federal governments and other authorities that have legal jurisdiction over the site.

B. Prior to commencement of work, notify State and applicable authorities as required and submit all of the applicable notifications for construction, operation and demolition. Secure required permits and inspections from any of the authorities having jurisdiction, for this work and pay for all fees required for permits, inspections and review, including special agency construction.

C. Include all utility and local building department charges for providing temporary and permanent water, sewer, and gas services to buildings.

D. Provide Commissioner and Commissioner's representatives from any of the authorities / agencies having jurisdiction access to work at all times.

E. Trade Contractor shall be responsible for all law violations caused by the work under this Division. Notify Construction Manager in writing when a discrepancy occurs between code requirements and work shown on drawings and resolve matter before proceeding with work.

F. When requirements cited in this specification conflict with each other or with Contract Documents, most stringent shall govern work. The Commissioner may relax this requirement when such relaxation does not violate ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing.

G. Make corrections in the work as required by the Commissioner to pass local regulations.

H. Deliver to the Commissioner any and all certificates of inspections, permits, and approvals. Submit final inspection certificates signed by governing authorities to the Commissioner.

I. Make all necessary submissions to the Department of Environmental Protection, Bureau of Air Resources and Management, Department of Labor and Industry and other agencies having jurisdiction. Pay all required fees for review, registration and sign off.

1.19 OPERATING AND MAINTENANCE MANUALS

A. General: Obtain at time of purchase of equipment, three copies of operation, lubrication and maintenance manuals for all items. Assemble literature in coordinated manuals with additional information describing combined operation of filed assembled units, including as-built wiring diagrams. Manual shall contain names and addresses of manufacturers and local representatives who stock or furnish or repair parts for items or equipment.

B. Furnish as required by B=General Conditions copies of manuals to Commissioner. Deliver manuals no less than 30 days prior to acceptance of equipment to permit Commissioner's designated personnel to become familiar with equipment and operation prior to acceptance.

C. Provide framed and glazed charts as follows:

1. Flow diagrams from first part of manual as described above.

2. Valve directory.

3. Lubrication, valve and damper chart from third part of manual.

D. Operating Instructions: Upon completion of installation or when the Commissioner accepts portions of building and equipment for operational use, instruct Commissioner's operating personnel in any or all parts of all systems. Instructions shall be performed by factory trained personnel. Commissioner shall determine which systems shall require additional instructions. Duration of instruction shall take equipment through complete cycle of operation (at least 7 days). Make adjustments under operating conditions.

E. Protection of work:

1. Each Contractor shall be responsible for his work and equipment until finally inspected, tested, and accepted. Carefully store materials and equipment which are not immediately installed after delivery to site. Close open ends of work with temporary covers or plug during construction to prevent entry of obstructing material.

2. Each separate contractor shall protect the work and material of other trades that might be damaged by his work or workmen and make good all damage thus caused.

1.20 FIELD ADJUSTMENT TO PUMPS

A. Trade Contractor shall be responsible for changing or adjusting belts, drives, pulleys, motors, impellers, etc., as required, by adjustment for acoustic performance, and by balancing company to achieve the desired air and water delivery by all air handling equipment and pumps.

1.21 COOPERATION BETWEEN TRADES

A. Cooperate with all other Divisions performing work on this project as necessary to achieve a complete neatly fitted installation for each condition. Consult the Drawings and Specifications to determine nature and extent of work specified in other Divisions that adjoins or attaches to the work of this Division. Confer with other Divisions at the site to coordinate this work with theirs in view of job conditions to the end that interferences may be eliminated and that maximum head room and clearance may be obtained. In the event that interferences develop, the Commissioner's Representative's decision will be final as to which Division shall relocate its work, and no additional compensation will be allowed for the moving of piping, ductwork, conduit, or equipment, to clear such interferences. Provide templates, information, and instructions to other divisions to properly locate holes and openings to be cut or provided.

B. Ensure full co-ordination between controls subcontractor and Testing and Balancing subcontractor to ensure the system is commissioned in accordance with the complete requirements of the complete contract documents.

1.22 HOIST, RIGGING, TRANSPORTATION AND SCAFFOLDING

A. Provide all scaffolding, staging, cribbing, tackle hoist and rigging necessary for placing all materials and equipment in their proper places in the Project. All temporary work shall be removed from the premises when its use is no longer required.

1.23 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment in its original package to prevent damage or entrance of foreign matter. Perform all handling and shipping in accordance with manufacturer's recommendations. Provide protective coverings during construction.

B. Identify materials and equipment delivered to Site to permit check against approved materials list, reviewed Shop Drawings.

C. Completely cover motors and other moving machinery to protect from dirt and water during construction.

D. Cap all openings in pipe and ductwork daily to protect against entry by foreign matter.

E. Protect premises and Work of other Divisions from damage arising out of installation of Work of this Division.

F. Perform Work in manner precluding unnecessary fire hazard.

G. All ductwork shall be delivered to site with all ends and openings capped with minimum of heavy gauge polyethylene sheeting taped all around to prevent ingress of moisture, dust, debris, etc.

H. Protect from loss or damage. Replace lost or damaged materials and equipment with new at no increase in Contract Sum. Protect from damage, water, dust, etc., material, equipment and apparatus provided under this Division, both in storage and installed, until Notice of Completion has been filed. Provide temporary storage facilities for material and equipment. Material, equipment or apparatus damaged because of improper storage or protection will be rejected. Remove from Site and provide new, duplicate material, equipment or apparatus in replacement of that rejected.

I. All stock piled conduit and piping shall be placed on dunnage, and protected from weather and from entry of foreign material. All stored materials and equipment shall be carefully inspected prior to installation and replaced with new material or equipment if found to be damaged, corroded, etc.

1.24 GUARANTEE AND 24 HOUR SERVICE

A. Guarantee the Work of this section for one year following the date of Substantial Completion. If the equipment is used for ventilation, temporary heat, etc. prior to acceptance by the City of New York, the bid price shall include an extended period of warranty covering the minimum one year of occupancy starting from the initial date of final acceptance by the City of New York. The guarantee shall repair or replace defective materials, equipment, workmanship and installation that develop within this period, promptly and to Commissioner's satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within Contract Price.

B. In addition to guarantee requirements of General Conditions Section 01000 and of Paragraph A above, obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation, with City of New York as the Owner.

C. Replace material and equipment that require excessive service during guarantee period as defined and as directed by Commissioner.

D. Provide 24 hour service beginning on the date of substantial completion and lasting until the termination of guarantee period. Service shall be at no cost to City of New York. Service can be provided by this Contractor or a separate service organization. Choice of service organization shall be subject to Commissioner's approval. Submit name and phone number that will be answered on a 24 hour basis each day of the week, for the duration of the service.

E. Submit copies of equipment and material warranties to Commissioner before final payment.

F. At end of guarantee period, transfer manufacturer's equipment and warranties still in force to the City of New York.

G. This paragraph shall not be interpreted to limit City of New York's rights under applicable codes and laws under this Contract.

H. Part 2 Paragraphs of the Specification sections may specify warranty requirements that exceed those of this Paragraph.

I. Use of systems provided under this Section for temporary services and facilities shall not constitute Final Acceptance of work nor beneficial use by the City of New York, and shall not institute guarantee period.

J. Provide manufacturer's engineering and technical staff at site to analyze and rectify problems that develop during guarantee period immediately. If problems cannot be rectified immediately to Commissioner's satisfaction, advise him in writing, describe efforts to rectify situation, and provide analysis of cause of problem. Commissioner will suggest course of action.

PART 2 PRODUCTS

2.1 GENERAL

A. Refer to each specific Plumbing Section for details.

2.2 MATERIALS

A. Equipment and materials shall be as described in the respective Sections of Division 22 and Division 26 and as shown.

B. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.

C. Equipment, material damaged during transportation, installation, operation is considered as totally damaged. Replace with new. Variance from this permitted only with written acceptance.

D. All items of materials in each category of equipment shall be of one manufacturer.

E. Material and Equipment–General Requirements:

1. New.

2. Approved for use in the City of New York.

3. Testing agency labeled or with other identification wherever standards have been established.

4. City of New York's Representative reserves right to reject items not in accordance with Specification either before or after installation.

5. Comprised to render complete and operable systems; provide additional items needed to complete installation to realized design.

6. Compatible with space allocated. Modifications necessary to adjust items to space limitations at Contractor's expense.

7. Installed fully operating and without objectionable noise or vibration.

2.3 FLAME-SPREAD AND SMOKE-DEVELOPED PROPERTIES OF MATERIALS

A. All materials and adhesives used throughout the mechanical systems shall have a flame spread rating not over 25 without evidence of continued combustion and with a smoke-developed rating not higher than 50. Materials include but not limited to are insulation, acoustical lining, filter, ducts, flexible connections, jackets or coverings regardless of kind, etc. If such materials are to be applied with adhesives and the adhesives used shall have a flame-spread rating not over 25 and a smoke developed rating not higher than 50.

B. "Flame Spread Rating" and "Smoke Developed Rating" shall be as determined by the "method of test of surface burning characteristics of building materials, NFPA no. 244, ASTM E84, Underwriters' Laboratories, Inc., Standard." Such materials are listed in the Underwriters' Laboratories, Inc., "Building Materials List" under the heading "Hazard Classification (Fire)."

PART 3 - EXECUTION

3.1 COMMISSIONING OF EQUIPMENT AND SYSTEMS

A. General

1. For the commissioning requirements refer to Section 22 0800.

2. Completion of start up and commissioning shall be accomplished as a prerequisite for substantial completion and shall be completed for each phase of construction.

3. Operate and maintain systems and equipment until final acceptance by Commissioner.

4. All guarantees and warranties shall not begin until final acceptance of the systems and equipment by the Commissioner. Acceptance requires, at a minimum complete systems and commissioning.

5. The Commissioner maintains the right to have access to the entire project site to develop his own operational procedures.

B. Comprehensive Work Plan and Reporting

1. Provide detailed, methodical, scheduled, start up and commissioning procedures and execution of same and every system and piece of equipment provided.
2. Attend start up and commissioning meetings on a regular basis, as directed by the General Contractor or Construction Manager.
3. Develop and provide a written work plan with detailed procedures for this work and submit, using shop drawing submittal procedure, within 6 weeks of the contract award. The work plan shall include provisions for an integrated start up plan and schedule. The plan and schedule shall identify tasks, start and completion dates, critical path items, interface requirements with other trades and major equipment start up, as minimum requirements of the plan. The plan and schedule shall clearly identify work in each construction phase, as well.
4. The purpose of this work plan is to provide for smooth, quick, and efficient start up and commissioning of systems and equipment and for a smooth transition to turn the complete, correctly operating building over to the City of New York, at each phase of construction.
5. The Commissioner will have input to and be part of approval process for start up and commissioning plan.
6. Develop and submit for approval a specific start up, check out and sign off form for every piece of major equipment.
7. Develop and submit for approval a specific start up, check out and sign off form for every piece of major system.
8. Systems shall be operated under actual or simulated full load conditions. Identify the operating conditions in the work plan.
9. Work plan shall incorporate the below specified "Demonstration of Successful Operation"
10. The Commissioner may check the completed and commissioned installation either sequentially as different parts are completed, and/or when the entire installation is complete, at sole option of the Commissioner.
11. Each trade contractor shall arrange that an officer of his contracting company shall certify that each and every system has been tested. At the conclusion of the tests, this contractor shall submit a letter and enclosed commissioning forms signed by the officer stating:
    a. That he is the officer of the company.
    b. That he certifies that the specified testing of the systems has been performed by the company (give the name and dates of system testing).
    c. The results of testing as compared to specified performance, listing the name, title, and company affiliation of all those witnessing and performing these tests.

C. Commissioning

1. Commission equipment and systems in accordance with the approved work plan, completing the start up, check out and sign off forms for each piece of equipment and each system.

2. Provide qualified personnel, equipment, apparatus and services for start up and testing of equipment and systems, to obtain the performance shown in schedules, as specified or on commissioning forms, and as required by codes, standards, regulations and authorities having jurisdiction including Municipal Inspectors and Commissioner.

3. Start up and testing procedures as may be outlined in various mechanical and electrical sections of the specifications are the minimum effort required for the project. Contractor shall use any additional procedures he feels will be necessary to properly start up and test the systems and equipment actually installed on the job at no additional cost to the City of New York.

4. Prove capacity and performance of equipment by field testing. Install thermowells and gauge connections and, at no additional cost to City of New York, equipment and instruments required for testing.

5. Qualified representative of equipment manufacturer shall be present at test.

6. For each piece of equipment, copy nameplate data and include with the letter and start up, check out and sign off forms referred to above.

7. Do not cover or conceal work before testing and inspection and obtaining approval.

8. Leaks, damage and defects discovered or resulting from start up and testing shall be repaired or replaced by this contract to like-new condition with acceptable materials. Tests shall be continued until system operates without adjustments or repairs.

D. Demonstration of Successful Operation: After all components and every system has been completely commissioned, provide a two week, 24 hour per day fully functional automatic operation period of all systems simultaneously. This shall be successfully concluded before systems are accepted by the Commissioner.

3.2 SPECIAL RESPONSIBILITIES

A. Cooperate and coordinate with work of other Sections in executing work of this Section.

1. Perform work such that progress of entire project including work of other Sections shall not be interfered with or delayed.

2. Provide information as requested on items furnished under this Section which shall be installed under other Sections.

3. Obtain detailed installation information from manufacturers of equipment provided under this section.

4. Obtain final roughing dimensions or other information needed for complete installation of items furnished under other Sections.

5. Keep fully informed as to shape, size and position of openings required for material or equipment to be provided under this and other Sections. Give full information so that openings required by work of this Section may be coordinated with other work and other openings and may be provided for in advance. In case of failure to provide sufficient information on proper time,

provide cutting and patching or have same done, at own expense and to full satisfaction of Commissioner.

6. Provide information as requested as to sizes, number and locations of housekeeping pads necessary for floor mounted vibrating and rotating equipment provided under this Section.

7. Notify Commissioner of location and extent of existing piping, conduit, ductwork and equipment that interferes with new construction. In coordination with and with approval of Commissioner, relocate piping, ductwork and equipment to permit new work to be provided as required by Contract Documents. Remove non-functioning and abandoned piping, ductwork and equipment as directed by Commissioner. Dispose of or store items as requested by Commissioner.

B. Installation Only Items

1. Where this contractor is required to install items which it does not purchase, it shall coordinate delivery and be responsible for their unloading from delivery vehicles and for their safe handling and field storage up to time of installation.

2. This contractor shall carefully examine such items upon delivery. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of work of this contractor will be considered only if presented in writing within one week of their date of delivery. Unless such claims have been submitted this contractor shall be fully responsible for the complete reconditioning or replacement of the damaged items.

C. Maintenance of equipment and systems: Maintain equipment and systems until Final Acceptance. Ensure adequate protection of equipment and material during delivery, storage, installation and shutdown and during delays pending final test of systems and equipment because of seasonal conditions.

D. Use of premises: Use of premises shall be restricted as directed by Commissioner and as required below:

1. Remove and dispose of dirt and debris, and keep premises clean. During progress of work, remove equipment and unused material. Put building and premises in neat and clean condition, and do cleaning and washing required to provide acceptable appearance and operation of equipment, to satisfaction of Commissioner.

2. Store materials in a manner that will maintain an orderly clean appearance. If stored on-site in open or unprotected areas, all equipment and material shall be kept off the ground by means of pallets of racks and covered with tarpaulins.

3. Do not interfere with function of existing sewers and water and gas mains, electrical or mechanical systems and services. Extreme care shall be observed to prevent debris from entering pipe, ductwork and equipment. Confer with Commissioner as to disruption of services or other utilities due to testing, connection of new work to existing. Interruption of services shall be performed at time of day or night deemed by Commissioner to provide minimal interference with normal operation. Obtain Commissioner's approval of the method proposed for minimizing service interruption.

E. Surveys and Measurements:

1. Base measurements, both horizontal and vertical, on reference points established by Contractor and be responsible for correct laying out of work.

2. In event of discrepancy between actual measurements and those indicated, notify Commissioner in writing and do not proceed with work until written instructions have been issued by Commissioner.

F. Fireproofing:

1. Clip, hangers, clamps, supports and other attachments to surfaces to be fireproofed shall be installed, insofar as possible prior to start of spray fiber work.

2. Piping and other items which would interfere with proper application of fireproofing shall installed after completion of spray fiber work.

3. Patching and repairing of fireproofing due to cutting or damaging to fireproofing during course of work specified under this section shall be shall be performed by installer of fireproofing and paid for by the trade responsible for damage and shall not constitute grounds for an extra to City of New York.

G. Temporary Utilities:

1. Refer to General Conditions Section 01000 regarding requirements.

2. Coordinate work under this Section with progress of construction so that permanent heating system will be ready for temporary heating if permitted by Commissioner as soon as the building is closed in.

H. If, after the plant is in operation, any piping systems, coils or other apparatus are stratified or air bound (by vacuum or pressure), they shall be repiped with new approved and necessary fittings, air vents, or vacuum breakers at no extra cost. If connections are concealed in furring, floors or ceilings, this trade shall bear the cost of tearing up and refinishing construction and finish, leaving same in as good condition as before it was disturbed.

I. Miscellaneous: Unload materials and equipment delivered to site. Pay cost for rigging, hoisting, lowering and moving electrical equipment on and around site, in building or on roof.

3.3 MATERIALS AND WORKMANSHIP

A. Work shall be neat and rectilinear. Piping, etc. shall run concealed except in mechanical rooms and areas where no hung ceiling exists. Install material and equipment as required by manufacturers. Installation shall operate safely and without leakage, undue wear, noise, vibration, corrosion or water hammer. Work shall be properly and effectively protected, and pipe and duct openings shall be temporarily closed to prevent obstruction and damage before completion.

B. Except as specified otherwise, material and equipment shall be new. Provide supplies, appliances and connections necessary for complete and operational installation. Provide components required or recommended by OSHA and applicable NFPA documents.

C. Finish of materials, components and equipment shall be as approved by Commissioner and shall be resistant to corrosion and weather as necessary.

D. The City of New York will not be responsible for material and equipment before testing, commissioning, and acceptance.

3.4 CONTINUITY OF SERVICES

A. Do not interrupt existing services without Commissioner's approval.

B. Schedule interruptions in advance, according to Commissioner's instructions. Submit, in writing, with request for interruption, methods proposed to minimize length of interruption.

C. Interruptions shall be scheduled at such times of day and work so that they have minimal impact to Owner's operations.

D. Subcontractor shall coordinate any shutdowns of existing systems as follows:

1. Give proper notice to Commissioner when making shutdowns; a minimum of fourteen full days are required.

2. Minimize shutdowns of any system.

3. Provide temporary services where required and perform shutdown and tie-ins at a time convenient to Commissioner.

4. Subcontractor shall be responsible for completing and filing Commissioner's shutdown notice questionnaire.

5. Perform required survey and inspection work required by the notice for shutdown.

E. Include premium time work associated with interruption of services and/or shutdown as necessary to avoid disruption to Owner's operations.

3.5 WELDING

A. Weld only by approved acetylene or electric welding process and welders shall hold certifucate from approved insurance company.

B. Conduct tests to demonstrate suitability of procedures to be used in making welds which conform to specified requirements.

C. Specification for welding procedure shall meet requirements of Welding Qualifications, Section IX, ASME Boiler and Pressure Vessel Code and ANSI B31.1.

D. Align components. No strain shall be placed on weld during welding. No part of pipe shall be offset more than 20% of thickness. Set flanges and branches properly.

E. Welder qualification:

1. Test welders to demonstrate ability to make acceptable welds. Tests conducted for qualification of welder for work under one Division or Section shall not qualify welder for work under another Division or Section.

2. Tests shall be as prescribed for welder qualification in Section IX of the ASME Code.

3. Records of such tests shall be as follows: Each welder shall be assigned an identifying number, letter or symbol. Identifying mark shall be stamped adjacent to welds made by this welder. Identification shall be at top of horizontal piping and at front of vertical piping.

4. Maintain record of welders employed, showing dates and results of tests and identifying mark assigned to each welder. Certify records and make them accessible to the City of New York's project representative. Before completion of project, one copy of records shall be turned over to Commissioner.

5. No qualification shall be older than three years when welder commences to work on this project. If the welder has not welded in required welding process for a period of six months, he shall be re-certified.

F. Welding Tests

1. As designated by Commissioner, remove welds for destructive testing or for testing by non-destructive means.

2. If, in Commissioners opinion, welds so tested do not meet requirements of Sections VIII and IX of ASME, then the contractor shall pay for costs of the tests. Remove welds welded by that welder at no cost to the City of New York. Rewelding shall be performed by qualified welder other than welder whose weld did not pass the test. Welders whose welds were defective shall not be employed on site for remainder of the project.

3. Welding of stanchions, brackets, anchors and other welding not performed on pipe joints shall be in accordance with requirements of AWS specifications and requirements.

3.6 ACCESS AND ACCESS PANELS

A. Access panels shall be provided where indicated on drawings. Include allowance for 24x24 access panels in sheetrock ceilings for ceiling mounted equipment.

B. Provide proper access to materials and equipment that require inspection, replacement, repair or service, and coordinate their delivery with the installing Trade. If proper access cannot be provided, confer with Commissioner as to the best method of approach for minimizing effect of reduced access which may result.

C. Coordinate and prepare a location, size, and function schedule of access panels required to fully service equipment and deliver to a representative of installing Trade. Furnish and install distinctively colored buttons (color as selected by Commissioner) in finished ceiling to identify all access panels.

D. Furnish access panels for installation under other Sections where shut-off valves, control valves, check valves, or other items installed under this section require access and are concealed in floor, wall, furred space or above ceiling. Access panels shall be by Milcor, Knapp, Nystorm or Inlanf Steel; coordinate selection with other Section supplying similar access panels

E. Ceilings consisting of lay-in or removable splined tiles do not require access panels and dampers, splitters, or test hole openings above ceiling shall have location marked with thumb tack on finished ceiling panel. Location shall be noted on record drawings.

F. Access panels shall have same fire rating classification as surface penetrated

G. Panels shall be at least 12"x12"; access panels at equipment (VAV boxes, fan boxes and others) shall be 18"x18".

3.7 PENETRATIONS AND SLEEVES

A. General

1. Layout penetration and sleeve openings in advance, to permit provision in work. Set sleeves and conduit in forms before concrete is poured. Provide remedial work where sleeves and conduits are omitted or improperly placed.

2. Provide sleeves and packing materials at all penetrations of foundations, walls, slabs (except on grade), partitions and floors. Sleeves shall meet NFPA 101 requirements and material requirements of these specifications.

3. Sleeves that penetrate outside walls, basement slabs, footings and beams shall be waterproof.

4. Coordinate work carefully with architectural and structural. Set sleeves in forms before concrete is poured. Provide core drilling as necessary if walls are poured, or otherwise constructed, without sleeves and a wall penetration is required. Provide core drilling as required for penetration of existing construction. Do not penetrate structural members without Commissioner's approval.

5. Sleeves for insulated pipe and duct in no-fire rated construction shall accommodate continuous insulation without compression. Sleeves and/or penetration in fire rated construction shall be packed with fire rated material which shall maintain the fire rating of the wall. Seal ends of penetrations to provide continuous vapor barrier where insulation is interrupted.

6. Where pipes, etc. passing through openings are exposed in finished rooms, finishes of filling materials shall match and be flush with adjoining floor, ceiling, and wall finishes.

7. Identify unused sleeves and slots for future installation.

8. Fill slots, sleeves and other openings in floors and walls not used. Fill spaces in openings after installation of pipe, duct, conduit or cable.

9. Fill for floor penetration shall prevent passage of water, smoke, fire, and fumes. Fill shall be fire resistant in fire floors and walls, and shall prevent passage of air, smoke and fumes.

10. Sleeves through floors shall be watertight and shall extend 2" above floor surface.

B. Pipe and Conduit Sleeves:

1. Annular space between pipe/conduit and sleeve shall be at least ¼".

2. Sleeves are not required for slabs-on-grade unless specified otherwise.

3. Sleeves and packing materials, through rated firewalls and smoke partitions shall maintain fire rating of construction penetrated.

4. Do not support piping risers or conduit on sleeves.

C. Duct Sleeves and Prepared Openings:

1. Provide duct sleeves for round ducts 15" and smaller; provide prepared, framed openings for round ducts larger and for square, rectangular and flat oval ducts, except as otherwise specified otherwise. Sleeves shall meet SMACNA requirements.
2. Provide sleeves for ducts through 1-, 2- 0r 3- hour fire rated construction and smoke partitions, regardless of size or shape of ducts. Sleeves shall maintain fire rating of construction penetrated. Sleeve and seal materials, construction and clearances shall meet requirements of SMACNA Fire Damper and Heat Stop Guide for Air Handling Systems.
3. Prepared openings shall be framed to provide 1" clearance between framing and duct or duct insulation.

D. Installations, Testing and Approvals:

1. Installation shall meet manufacturer's recommendations exactly, particularly regards to safety, ventilation, removal of foreign materials and other details of installation. Dam openings as recommended. Remove flammable materials used for damming and forming seals in fire rated construction.
2. Sleeve penetration methods shall be water- and gas- tight and shall meet requirements of ASTM 119 Standard Methods of Fire Tests of Building Construction and Materials.
3. Fire-stop penetration seal methods and materials shall be FM-approved and UL-listed as applicable. They shall have same rating as the structure penetrated. Submit manufacturer's detail sheet indicating assembly rating.
4. Inspect foamed sealants to ensure manufacturer's optimum cell structure and color ranges.

3.8 ANCHORS AND INSERTS

A. Inserts shall be iron or steel of type to receive machine bolt head or nut after installation. Insert shall permit adjustment of bolt in one horizontal direction and shall develop strength of bolt when installed in properly cured concrete.

B. Provide anchors as necessary for attachment of equipment support and hangers.

3.9 ESCUTCHEONS

A. Install escutcheons around exposed pipe passing through finished floor, floor, wall, or ceiling. Escutcheons shall be heavy cast brass, chromium plated, adjustable, and of sufficient outside diameter to cover sleeve opening and shall fit snugly around pipe and flush against floor or wall surface. Escutcheon plates shall be provided on pipes at fixtures and shall be polished chrome plated. Plated steel escutcheon plates are not acceptable. Sample escutcheon plates shall be submitted to the Commissioner for approval prior to installation.

3.10 CORE DRILLING

A. Core drilling is to be avoided.

B. Set sleeves prior to installation of structure for passage of pipes, conduits, ducts, etc.

C. Where core drilling is unavoidable, or required by renovation projects, locate all required openings prior to coring and submit to Commissioner for review.

D. Coordinate openings with General Contractor/Construction Manager and all other trades.

E. Core drilling is to be provided by the Contractor for General Construction and not by the M/E subcontractors.

F. Do not disturb existing systems.

G. Thoroughly investigate existing conditions in vicinity of required opening prior to coring.

3.11 CARPENTRY, CUTTING AND PATCHING

1. In accordance with General Conditions Section 01000, Cutting and Patching Article, and as follows.

2. Provide all sleeves, core drilling, carpentry, cutting and patching required for proper installation of material and equipment shall be provided as per Construction Manager's bid package.

3. Do not cut or drill structural members without consent of Commissioner and Commissioner.

3.12 EXCAVATING & BACKFILLING

A. Preparation:

1. In accordance with the requirements of Division 31.

2. Provide barricades, signs, lanterns, shoring, sheeting and pumping as part of Work in this Division as required to insure safe conditions.

3. Dig trenches straight, true to line and grade with sides and bottoms smoothed of any rock points. Excavate 6 inches below grade of pipe, fill with sand properly packed. Support pipe for entire length on packed sand. Shape or pack bottom of trenches for pipe, duct fittings, hubs, couplings, etc., using templates to fit outside periphery of lower third of piping and ductwork. Provide piping outside building with 36 inch minimum cover from top of pipe to finished grade. Minimum width 16 inches.

4. Dispose of all surplus excavation material and seepage water as directed.

5. Backfill per Construction Manager's bid package

6. After piping has been installed, tested and approved, backfill all excavation, tamp and compact by compressed air tampers.

7. Backfill to 6 inches above crown of pipe with unwashed sand, with remainder of trench back-filled and mechanically tamped in 6 inch maximum layers of selected excavated materials, free from organic matter, rocks, etc. Provide 90 percent compaction in accordance with ASTM D 1557-58T; 95 percent compaction for trenches below building slabs.

8. In any asphalt or concrete paved areas, backfill only to subgrade level.

9. When piping is installed, and prior to backfilling, advise Commissioner. Do not backfill without acceptances of Commissioner.

10. Replace to original condition all paving, curbs, gutters, walks, etc., which become disturbed by trenching.

3.13 CUTTING AND REPAIRING

1. Assume responsibility for damage to any part of premises or Work of other Divisions, caused by leaks or breaks in piping or equipment furnished or installed under this Division during construction and guarantee/warranty period.

3.14 VIBRATION CONTROL

1. Coordinate with General Conditions Section 01000.
2. Design criteria for all the Work of Division 22 are specified in Section 220548.

3.15 CONCRETE EQUIPMENT BASES

1. Locate and size concrete base for all equipment located on existing floors. Base: 6 inches high and extending 6 inches beyond edge of equipment base unless indicated otherwise. Trade Contractor shall ensure equipment elevation is suitable for gravity drainage where relevant.
2. Coordinate concrete bases; concrete is specified in Division 03 0000.

3.16 WATERPROOF CONSTRUCTION

1. Maintain waterproof integrity of penetrations of materials intended to be waterproof. Provide flashing at exterior wall and roof penetrations. Caulk watertight penetrations of foundation walls and floors. Provide membrane clamps at penetrations of waterproof membranes.
2. Provide galvanized sheet metal weather protection canopies, hoods or enclosures over all out-of-doors equipment, the operation or maintenance of which would be impaired by rainwater. This requirement applies to damper operators and bearing, damper motors, controls, and instruments. See other paragraphs in this Division for application of this requirement to motors, drive, ducts, and fans.

3.17 RESTORATION OF DAMAGE

1. Repair or replace, as directed by Commissioner, materials and parts of premises which become damaged as result of installation of Work of this Division. Remove replaced parts from premises.

3.18 LINTELS

A. Where openings break into an already completed wall as a result of a failure to set sleeves or provide openings during erection of the wall, the Trade Contractor shall provide lintels as required for the support of building construction above the inserted item.

B. Lintels shall be structural steel angles, channels or tees of proper size and sections for the supported load; submit to the Commissioner with supporting calculations for approval prior to the installation.

C. Where new openings are required in an existing wall co-ordinate opening size, location and lintel type with structural engineer.

3.19 ROOF OPENINGS AND CURBS

A. Roof openings where required shall be coordinated with all affected Trades and all flashing and patching shall be as per details indicated on the Architectural plans.

3.20 TOOLS AND EQUIPMENT

A. Furnish all tools and equipment necessary for the proper installation, protection and upkeep of the Work.

3.21 ADJUSTMENT

A. Preliminary Operation:

1. Operate any portion of installation for Owner's convenience if so requested by Commissioner. Such operation does not constitute acceptance of Work as complete. Cost of utilities, such as gas and electrical power, will be borne by City of New York if Commissioner requests operation.

B. Startup Service:

1. Prior to startup, ensure that systems are ready, including checking the following: proper equipment rotation, proper wiring, auxiliary connections, lubrications, venting fan balance, controls and installed and properly set relief and safety valves.

C. Start and operate all systems. Provide services of factory trained technicians for startup of major equipment and systems including chillers, boilers, pumps, air handling units, etc.

D. Adjusting:

1. Adjust all equipment and system components as shown or as otherwise required to result in intended system operation.

2. Thereafter, as a result of system operation or as directed by Commissioner, make readjustments as necessary to refine performance and to effect complete system "tune-up".

3. After completion of testing and adjustment, operate the different systems and equipment under normal working conditions for 72 hours continuously and show specified performance. If, in the opinion of the Commissioner, performance of equipment or systems is not in accordance with specifications or submitted data, alter or replace equipment at no increase in Contract Sum. Trade Contractor, at his option, may order tests from an independent approved laboratory to prove compliance. All such tests shall be at no increase in Contract Sum. Repeat process as often as required. If the reason for unsatisfactory operation is design errors all additional cost for corrective measures will be reimbursed to the contractor.

4. At completion of Work, provide written certification that all systems are functioning properly without defects.

E. Noise:

1. Cooperate in reducing any objectionable noise or vibration caused by mechanical systems to the extent of adjustments to specified and installed equipment and appurtenances.
2. Cooperate in adjustment of mechanical systems and terminal devices, as directed by Commissioner, to obtain specified acoustic properties.
3. Completely correct noise problems caused by failure to make installation in accordance with Contract Documents, including labor and materials required as a result of such failure, at no increase in Contract Sum. Includes refinish walls, floors etc.

3.22 INSTALLATION OF EQUIPMENT

A. Use printed descriptions, specifications and recommendations of manufacturers as a guide for installation of Work.

B. Assemble equipment required to be field assembled under the direct supervision of the manufacturers' agent. Prior to the final acceptance submit letters from the manufacturers that this has been done.

C. Avoid interference with structure and with work of other trades, preserving adequate headroom and clearing doors and passageways, to satisfaction of Commissioner and in accordance with code requirements. Installation shall permit clearance for access to equipment for repair, servicing and replacement.

D. Install equipment so as to properly distribute equipment loads on building structural members provided for equipment support under other Sections. Roof mounted equipment shall be installed and supported on structural steel provided under other Sections.

E. Provide suspended platforms, strap hangers, brackets, shelves, stands or legs as necessary for floor, wall of ceiling mounting of equipment as required.

F. Provide steel supports and hardware for proper installation of hangers, anchors, guides, etc.

G. Provide cuts, weights, and other pertinent data required for proper coordination of equipment support provisions and installations.

H. Structural steel and hardware shall conform to Standard specifications of ASTM; use of steel and hardware shall conform to requirements of Section V of Code of Practice of American Institute of Steel Construction.

I. Verify site conditions and dimensions of equipment to ensure access for proper installation of equipment without disassembly, which will void warrantee. Report in writing to Commissioner, prior to purchase or shipment of equipment involved, on conditions which may prevent proper installation.

3.23 ELECTRICAL REQUIREMENTS

A. Electrical Work in this Division shall conform to requirements of Division 26 0000.

B. This Contractor shall <u>furnish</u> all motors, starters, variable frequency drives, disconnects for motors and heating coils and controls for equipment under his Contract, unless otherwise noted.

C. Division 260000 Contractor shall install all starters, variable frequency drives, disconnects and overload protectors furnished by this Contractor and shall provide all necessary wire, conduit and boxes to properly connect equipment for this Contractor no matter how many disconnects, starters, etc are included, unless otherwise noted. Electrical Contractor shall receive, unload, set and install motor starters, disconnects and other items to be installed under Division 26000.

D. This Contractor shall provide all necessary conduit and control wiring to pushbuttons, thermostats, pilot lights, interlocks and similar equipment for equipment under this Division.

E. Where the starter and/or safety switch is an integral part of equipment assembly, the assembly shall be furnished with the wiring complete between starter, controller and motor. The Electrical Contractor will make connections to unit terminals.

F. Factory wired assemblies and panels: Pre-wired to numbered terminal strips for connection to field wiring. Provide disconnect switch for each control circuit connection to pre-wired assemblies and control panels.

G. All motor control centers (MCCs) shall be provided and installed by the electrical contractor. If the Electrical Contractor is providing MCCs for specific motors, the Mechanical Contractor shall not furnish starter for those specific motors. However the Mechanical Contractor shall coordinate with Electrical Contractor the starter requirements to insure proper operation of those motors.

H. All motors and motor control equipment shall meet the requirements of NEC, and shall comply with requirements of the Public Utility Company furnishing service and with rules and regulations of all authorities having jurisdiction.

I. THIS CONTRACTOR SHALL VERIFY VOLTAGE AT SITE BEFORE ORDERING ANY ELECTRICAL EQUIPMENT.

J. Wiring:

1. Power wiring: Except for factory wiring on mechanical equipment, power wiring is specified in Division 260000.

2. Plumbing control wiring:

   a. All wiring and conduit shall be according to latest edition of the NEC. All control wiring shall be installed in EMT in accordance with applicable portions of NEC and requirements of Division 26 0000.

   b. Low voltage wiring in air plenums shall be UL approved conductor for application as manufactured by Alpha or Beldon.

3. Fire protection system wiring: See Division 260000.

4. Provide electrical contractor approved wiring diagrams for work to be connected under Division 260000.

K. Provide weatherproof devices and installation for out-of-doors work.

L. Motors:

1. Provide motors for equipment specified. Separately shipped motors are to be installed by Division 23. Coordinate with Division 26.

2. Separately shipped motors and variable frequency drives shall be received unloaded installed by Division 23, wired by Division 26. Adjustable motor bases and all bolts and nuts required for installation of base and motor shall be provided and installed by Division 23.

3. Align and adjust mechanical coupling for direct-driven motorized equipment. Adjust and align drive and belt tension on belt-driven equipment.

4. Field lubricate all motors prior to operation and maintain lubrication prior to acceptance of equipment by the Commissioner.

5. Provide to electrical contractor motor terminal connection diagram as prepared by motor manufacturers.

6. The Electrical Contractor shall be responsible for proper rotation of three phase equipment.

M. Power Factor Correction:

1. This Contractor shall be responsible for all equipment, labor, coordination and all other related appurtenances required for the installation of power correction devices at all equipment supplied under this contract. Equipment requiring power correction devices shall be furnished and installed with the same as hereinafter specified. Power factor correction devices (including means and methods) shall be included as part of their respective equipment submittal, materials, wiring diagrams, shop drawings, and catalog cuts for review by the Commissioner.

2. Devices shall be furnished and installed to ensure a minimum power factor of over 90% over the full operating range of the equipment. Equipment requiring power factor correction devices are:

a. Pumps

3.24 PAINTING

A. Equipment installed shall have shop coat of non-lead gray paint. Hangers and supports shall have one coat of non-lead primer. Machinery such as pumps, fans, etc., shall be stenciled with equipment name. Stencil shall be at least 6" high for large equipment, 2" high for small equipment. Finish painting, including painting of various piping and duct systems, shall be done under other Sections.

B. Paint all outside exposed equipment and equipment supports with two coats of weather resistant enamel.

C. Provide heat resistant paint for hot piping, equipment and materials.

D. Note requirement for Commissioner's approval invoked under paragraph MATERIALS AND WORKMANSHIP regarding finish of material and equipment, which are visible or subject to corrosive or atmospheric conditions.

E. Properly prepare Work under this Division to be finish painted under Division 09 0000

3.25 LUBRICATION

A. Lubricate all equipment at completion of Work. Furnish Commissioner with a written lubrication schedule for all equipment as specified in General Conditions Section 01000 and Division 23.

3.26 EXPANSION PROVISIONS

A. Installation of piping must allow for expansion using offsets, loops, swing joints, expansion joints, etc. as necessary to prevent undue strain. Take-offs from mains to runouts shall not have less than three elbow swing.

B. Mains and risers with loops or offsets shall be securely anchored to structure so as to impart expansion towards loops or offsets. Anchors shall be constructed of heavy forged wrought iron, secured to pipe and to structure. Provide vibration isolation as required.

C. Provide pipe alignment guides as required to guide expanding pipe to move freely from anchor points toward expansion joints, offsets, etc.

3.27 CLEANING

A. Cleaning shall be performed prior to commissioning.

B. Completely cover all plumbing fixtures and all motors and other moving machinery to prevent entry of dirt and water during construction. Effectively cap all openings into ducts and pipes to keep foreign matter out during construction.

C. Protect all finished surfaces of fixtures with heavy paper pasted thereon, or by other means, throughout the period of construction.

D. Ductwork:

1. Ducts shall be thoroughly cleaned so that no dirt or dust shall be discharged from diffusers, registers or grilles, when system is operated.

2. Provide temporary connections for cleaning. Provide cheesecloth for openings during cleaning.

3. Replace filters prior to final inspection and testing.

E. Piping

1. Furnish pipe cleaning chemicals, chemical feed equipment, materials and labor necessary to clean pipe.

2. Permanently install necessary chemical injection fittings complete with stop valves.

3. After all piping systems have been pressure tested and approved for tightness, clean and flush piping as specified and as required by codes.

4. Maintain continuous blowdown and make-up, as required during flushing operation.

F. Equipment

1. After completion of project, clean exterior surface of all equipment, including concrete residue, dirt, paint residue, etc.

2. Plumbing fixtures - clean and polish fixtures immediately prior to final inspection.

3.28 SELECTIVE DEMOLITION

A. Refer to all drawings for general description of areas requiring demolition.

B. Refer to Construction Manager's bid package of requirements for selective demolition work.

C. Utilities: Maintain all utilities except those requiring removal or relocation. Keep utilities in service and protect from damage. Do not interrupt utilities serving used areas without first obtaining permission from the utility company and the Commissioner. Provide temporary services as required.

3.29 FINAL INSPECTION

A. As the work nears completion, review the requirements of the Contract Documents, inspect the work and inform all parties involved in work to be corrected or completed before the project can be deemed substantially complete.

B. When the Project is substantially complete, notify Construction manager and Commissioner in writing of this fact, listing those items of Work remaining incomplete, the reason therefore, and the anticipated date that all remaining work will be completed. Carry out own final inspection and satisfy the Work. The Construction Manager will then schedule final inspection of the Project.

C. The Commissioner reserves the right to cancel and reschedule the inspection in the event considerable more work remains to be completed or corrected than indicated in the written request for inspection.

D. All items not completed or found not complying with drawings or specifications by the Commissioner will be identified in their inspection report.

E. Correct all items on inspection report. Make the correction and initial and date each item on the report after corrections have been completed.

3.30 PROJECT CLOSE-OUT PROCEDURE

A. General

1. The requirements of this section are in addition to and supplement the requirements outlined in General Conditions Section 01000.

2. It shall be each contractor's responsibility to personally hand-deliver all of the required project close-out checklist items and to obtain Commissioner's authorized representative(s) signed receipt on all items requiring Commissioner sign-off.

B. Project Close-Out Checklist

1. Review requirements of each section of the specifications and submit for approval to Commissioner the sign-off forms which shall become the project close-out checklist. These, at a minimum, shall include the following information shown in attached Project Closeout Checklist Example. The Commissioner may

incorporate additional specific items to the following checklist which shall become part of project requirements.

2. Close-Out Checklist Example:

PROJECT CLOSE-OUT			
PROJECT:			
DIVISION NO:			
CONTRACTOR:			
ITEM[1]	DATES		OWNER'S SIGN-OFF
	COMPLETED	RECEIVED BY OWNER	
Permits			
City and County Inspection			
Manufacturer's Warranties			
State Fire Rating Data			
Copy of Final Shop Drawings			
List and Possession of Spare Parts			
Pressure Tests			
Equipment Tests Required by Specs			
O&M Manuals			
Record Documents			
Coordination Drawings			
Sanitization Reports			
Commissioning Reports/Letters/Forms			
On Site Training Complete			
Protective Device Settings			
Valve Tags and Charts			
Final ATC Installation Drawings			
Insurance Underwriters Approvals			
Final Punch List (Initialed by contractor that items are complete)			
Building Certificate of Occupancy			
24 Hr Phone No. for Service During Guarantee Period.			
[1] Provide separate line item for each specified item (do not group items).			

END OF SECTION 220500

SECTION 22 0503

PIPES AND TUBES FOR PLUMBING PIPING AND EQUIPMENT

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 City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2 SUMMARY

A. This Section specifies requirements for domestic water service piping, gas piping, storm and sanitary sewer piping.

B. Domestic water service and storm and sanitary sewers installed under this Section end inside of the perimeter foundation wall unless otherwise shown on the Contract Drawings.

C. Trenching and backfilling required in conjunction with underground piping furnished under this Section shall be as specified in applicable Sections of Division 2 and shall be included as Work under this Section.

1.3 WORK INCLUDED IN OTHER SECTIONS

A. Section 01 0000 – General Conditions

B. Addendum to General Conditions

C. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

D. Section 22 0523 – General-Duty Valves for Plumbing Piping.

E. Section 22 0548 – Vibration and Seismic Controls for Plumbing Piping and Equipment.

F. Section 22 0553 – Identification for Plumbing Piping and Equipment.

G. Section 22 0700 – Plumbing Insulation.

H. Section 22 1100 – Facility Water Distribution.

I. Section 22 1300– Facility Sanitary Sewerage.

J. Section 22 1400 – Facility Storm Drainage.

K. Section 22 3400 – Gas-Fired Domestic Water Heater.

L. Section 22 4000 – Plumbing Fixtures.

1.5 SUBMITTALS:

A. Shop Drawings and Product Data:

1. Refer to General Requirements for procedure and additional submittal requirements.

2. Furnish shop drawings and product data for each product specified in this section.

PART 2 - PRODUCTS

2.1 PIPE, FITTINGS, AND FLANGES

A. Unless otherwise shown on the Contract Drawings, provide pipe (and tube), fittings, and flanges in accordance with the "Pipe, Fittings, and Flanges Schedule" specified below, including gaskets, bolts, nuts, washers and other pressure containing parts necessary for the complete installation of piping systems.

B. Nipples shall be extra-heavy shoulder type. No close nipples shall be used. All nipples shall have designation mark of the manufacturer and shall conform to ASTM pipe specifications for system served.

C. Gaskets for flanges shall be 1/16 inch thick (after compression) rubber or neoprene, full-faced, and punched bolt holes.

D. Unions shall be malleable iron, threaded, conforming to ANSI B16.39.

E. Grooved couplings for copper tubing and grooved end copper fittings.

PIPE, FITTINGS, AND FLANGES SCHEDULE

SYSTEMS	PIPE	FITTINGS AND JOINTS
Below Ground Storm	Cast Iron, ASTM-A74,	Cast Iron, ASTM-A74, Extra

Pipes And Tubes For Plumbing Piping And Equipment

Drainage	Extra Heavy Weight, HUB and Spigot Type	Heavy Weight HUB and Spigot Type: ASTMC564 Neoprene Rubber Gaskets and Compression Joints
Below Ground Sanitary Drainage and Vent	Cast Iron, ASTM-A74, Extra Heavy Weight, HUB and Spigot Type	Cast Iron, ASTM-A74, Extra Heavy Weight HUB and Spigot Type: ASTMC564 Neoprene Rubber Gaskets and Compression Joints
Above Ground Sanitary Drainage and Vent	Cast Iron, CISPI-301 ASTM A888, Hubless Type	Cast Iron, CISPI –301ASTM A888, Service Weight, Hubless Type; CISPI 301, Neoprene Gaskets And Heavy Duty Stainless Steel Clamp
Above Ground Storm Drainage	Hot Dipped Galvanized Steel, ASTM A 53, Schedule 40 (exposed pipes and fitings have to be provided with PVC jackets)	Hot Dipped Galvanized Cast Iron (Drainage), ANSI B16.12, 125 lb. Class, Threaded
Sanitary Indirect Drainage	Galvanized Steel, ASTM A 53, Schedule 40	Galvanized Cast Iron (Drainage), ANSI B16.12, 125 lb. Class, Threaded
Domestic Water, Above Ground	Copper Tubing, ASTM B 88, Type L, Hard Temper, Nominal Wall (exposed pipes have to be provided with PVC jackets)	Cast Bronze, ANSI B16.18, Same Wall as Tube, Solder Joints for branches and Brazed Joints for Risers
Domestic Water, Below Ground	Copper Tubing, ASTM B 88, Type K, Hard Temper, Nominal Wall	Cast Bronze, ANSI B16.18, Same Wall as Tube, Brazed Joints
Domestic Water, exposed at plumbing fixtures	CP brass pipe	Threaded cast bronze fittings
Domestic Water and Fire Services (3 inches and larger)	Ductile Iron Cement Lined Class 52 AWWA C151& C104	Ductile Iron Push-On or Mechanical Joint C110 with AWWA C104 Cement Mortar Lined; Flanged Fittings inside building.

Gas (Above Ground)	Schedule 40 Black Steel ASTM A53	Malleable Iron, ANSI B16,.4, 125lbs. Class, Threaded
Gas (Below Ground)	Per National Grid standards	Per National Grid standards

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install piping and appurtenances in accordance with manufacturers' installation procedures, applicable codes and standards, and as specified.

3.2 FIELD TESTS

A. General

1. Perform tests as herein specified on the various piping systems or portions thereof prior to backfilling, painting, concealing or insulating.

B. Hydrostatic Tests

1. Storm and Sanitary Drainage and Vent

a. Tightly close all openings in the entire system and fill it with water to the point of overflow above the roof. The water level shall be maintained for one hour.

b. When piping is tested in sections, test piping with a pressure equivalent to a 10-foot water head. The water level shall be maintained for one hour.

c. For piping added, relocated or replaced on existing systems, install a test tee at the lowest elevation of each added, relocated or replaced piece of pipe and fill it with water to overflow level of next highest fixture outlet or drain. The water level shall be maintained for one hour.

2. Domestic Water

a. Cap or plug all outlets, apply a hydrostatic pressure of 125 psi and sustain such pressure for one hour.

b. For piping added, relocated or replaced on existing systems, apply a hydrostatic pressure of 50 psi above the existing system pressure for one hour.

C. Smoke and peppermint test:

1. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be verified as to materials, and shall be tested and proven gastight by either a smoke test or a peppermint test in accordance with NY Building Code.

D. Cleaning and Disinfecting

1. The potable water system shall be disinfected prior to use by a method of disinfection in accordance with the applicable code.

3.3 PAINTING

A. Upon completion of the installation, remove all protecting materials, thoroughly remove all scale and grease and leave in a clean condition for painting. Painting shall be in accordance with the requirements of Division 9, Section entitled "PAINTING".

3.4 INSULATION

A. Insulate all water piping in accordance with requirements of Section 22 0700.

B. Insulate all storm water piping in accordance with requirements of Section 22 0700.

C. Insulate waste piping carrying drainage from cooling coils, chillers and other similar equipment discharging wastes at temperature lower than ambient. Insulation shall be provided between fixture (floor drain, funnel drain, etc.) and stack or house drain.

D. Insulate water cooler waste piping in accordance with requirements of Section 22 0700.

END OF SECTION

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SECTION 22 0523

PLUMBING VALVES

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 City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2 DESCRIPTION

A. Provide and install all valves as indicated on the Drawings and as specified.

1.3 SUBMITTALS

A. Shop Drawings and Product Data:

1. Refer to General Requirements for procedure and additional submittal requirements.

2. Furnish shop drawings and product data for each product specified in this section.

1.4 RELATED WORK

A. Section 01 0000 – General Conditions

B. Addendum to General Conditions

C. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

D. Section 22 0503 – Pipes and Tubes for Plumbing Piping and Equipment.

E. Section 22 0553 – Identification for Plumbing Piping and Equipment.

F. Section 22 0700 – Plumbing Insulation.

G. Section 22 1100 – Facility Water Distribution.

H. Section 22 1300 – Facility Sanitary Sewerage.

I. Section 22 1400 – Facility Storm Drainage.

J. Section 22 3400 – Gas-Fired Domestic Water Heater.

K. Section 22 4000 – Plumbing Fixtures.

PART 2 - PRODUCTS

2.1 GENERAL

A. Nibco, Crane, Grinnell, Stockham, Hammond or approved equal. Provide valves of same manufacturer for all plumbing systems, including valves furnished with equipment.

2.2 EXTERIOR WATER SERVICE VALVES

A. Furnish and install all underground control valves and valve boxes for water service and branches as indicated on the Drawings.

B. All gate valves shall be similar and equal to Stockham G743-0 N.R.S. iron body, bronze mounted, double disc, parallel seat, mechanical joint, with operating nut. Valves shall be open left. Other manufacturer will be accepted when required by Local Authority.

C. All valves shall be installed complete with valve boxes and valve plate covers. All of the foregoing shall be included in the price of valves. Valve boxes shall be set so the tops are flush with proposed finished grade. They shall be reset if required to meet finished paving or grade.

D. All valve boxes, top and bottom sections and covers shall be manufactured by Kennedy, Fig. 121as specified for the fire service above coated with coal tar pitch varnish and word "WATER" cast on cover.

2.3 INTERIOR VALVES

A. Model numbers for 125 psi WOG unless noted otherwise.

Description	Mfg. No. 1	Mfg. No. 2	Mfg. No. 3

a. Gate Valves:

2 inches or smaller	Use Ball Valve specified herein.		
2-1/2 inches and larger 125-pound flanged iron body, bronze mounted, bronze stem, OS&Y, TFE imp.	Nibco F617-0	No. 465-1/2	Crane G-623 Stockham

b. Globe Valves:

2 inches and smaller, 125-pound bronze body, screwed ends, rising stem, TFE imp. Stem material to ASTM B62.	Nibco T211-B	Crane No. 7TF	Stockham B-16
2-1/2 inches and larger, 125-pound flanged iron body bronze mounted, bronze rising stem, TFE imp. asbestos-free packing.	Nibco F718-B	Crane No. 351	Stockham G512

c. Ball Valves:

1/4-inch to 2 inches 600-pound WOG bronze body, screwed ends, teflon seats and seals, maximum temperature 400 degrees F.	Nibco T595-Y	Crane 9302	Stockham S-216

e. Check Valves:

2 inches and smaller 200-pound bronze body, screwed ends, swing type.	Nibco T433-Y	Crane No. 37	Stockham B-321
2-1/2 inches and larger 125-pound iron body, bronze mounted, flanged, swing type.	Nibco F-918B	Crane No. 373	Stockham G-931

g. Gas cocks, AGA approved, UL listed:

Line valves 2 inches and smaller, square head, cock wrench bronze.	Walworth No. 590w/ No. 7904	Crane No. 250	Mueller No. H-1024

Line valves 2-1/2 inches and larger, short pattern, lubricated plug, including operating wrench.	Walworth 1700F	Rockwell No.143

2.4 BACKFLOW PREVENTERS

A. Provide Backflow Preventers conforming to AWWA ANSI B16.1 and ASSE Standard 1013.

B. On Domestic Water Service: Reduce pressure principle backflow preventer (RPZ) shall be rated for 180 degree and supplied with two full port ball valves. The main body shall be bronze, the seat ring and all internal polymers shall be NSF Listed. The first and second check valves shall be accessible for maintenance without removing the relief valve or the entire device from the line. The reduced pressure zone shall be provided with air gap fitting similar to Wilkins Model AG discharged into floor receptacle. The reduced pressure zone shall be Wilkins Model 975XL. Install and maintained in accordance with NYC DEP Cross-Connection Control Unit approved plans and application, Department of Health and Water Authority requirements.

C. On Fire Protection Services: Double check detector valve consisting of two independently operated spring-loaded center guided check valves, two tempered flanged end OS&Y, NYC approved water meter in by-pass line and four resilient seated ball valve test cocks similar to Wilkins Model 350 ADA. Install and maintained in accordance with NYC DEP Cross-Connection Control Unit, Department of Health and Water Authority requirements.

D. On connection to mechanical equipment: Reduced pressure principle Wilkins Model 975XL. Provide indirect waste with a funnel to spill over floor drain.

2.5 MASTER PRV VALVE:

A. Approved manufacturers: Wilkins, Watts or Amstrong.

B. Pressure reducing valve assembly shall consist of two pressure reducing valves in parallel. Valves have to be pilot type, globe, flanged or threaded, ductile iron body with bronze seat, disc guide and stainless steel stem and spring, similar to Watts Model M 115-74.

C. Valves have to rated for 150 psi pressure.

D. Pressure reducing valve shall be set at 60 psi.

2.6 THERMOSTATIC MIXING VALVE:

A. Bronze body and adjustable liquid filled thermostatic element for limiting outlet temperature to 80 degrees F, similar to Leonard, series 170.

B. Approved manufacturers: Watts or Amstrong.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide all equipment with shutoff valves. Provide all valves strainers, check valves, except control valves and unless specifically sized, of same size as the pipes in which they are installed unless otherwise indicated. Provide fixture stops.

B. All hand-controlled line valves are to be gate, ball or butterfly valves, except where throttling control or frequent operation is required, provide globe or angle valves, unless otherwise shown or specified. Install all globe and angle valves to close against the pressure.

C. Position gate valves so that stems are in any suitable angle from horizontal to upright position. Install valves only in accessible locations. Do not install valves with stems pointing downwards unless specifically indicated.

D. Wherever possible, install valves accessible from floor level. Provide operating handles for all valves and cocks. Provide adequate clearance for easy operation.

E. Support line valves at the valve in addition to regularly spaced pipe supports shown and specified.

F. Provide drain valves and hose adapters at all low points, etc.

G. Install swing checks and gravity closing lift checks in horizontal position.

H. Provide discharge pipe from all relief and safety valves. Extend to over approved drain receptacle with air gap.

I. Provide ball valves to isolate shock absorbers.

J. Provide open-ended line valves with plugs or blind flanges.

K. Where required for access provide access doors in accordance with Section 15010.

3.2 TESTING

A. Test valve bonnets for tightness. Test operate valves from closed-to-open-to-closed position while valve is under test pressure.

B. Test automatic valves including solenoid, pressure relief valves, safety valves and temperature and pressure relief valves for proper operation at settings indicated.

C. Insure that valves are field checked for packing and lubricant and that disc is for service intended. Replace leaking packing. Service valves which do not operate smoothly and properly with suitable lubricant before placing in operation.

D. Test relief valves, safety relief valves, safety valves and temperature and pressure relief valves three times.

END OF SECTION

SECTION 22 0548 – VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Isolation pads.
2. Isolation mounts.
3. Restrained elastomeric isolation mounts.
4. Freestanding and restrained spring isolators.
5. Housed spring mounts.
6. Elastomeric hangers.
7. Spring hangers.
8. Spring hangers with vertical-limit stops.
9. Pipe riser resilient supports.
10. Resilient pipe guides.
11. Restraining braces and cables.

B. Provide seismic-restraining, vibration isolation, soundproofing and noise control for equipment and piping including:

1. Pumps.
2. Hot Water Heaters
3. Gas piping

1.2 PERFORMANCE REQUIREMENTS

A. Seismic-Restraint Loading:

1. Site Class as Defined in the NYCBC: D.

2. Occupancy Category: II.
3. Assigned Seismic Design Category as Defined in the NYCBC: C.

   a. Component Importance Factor: 1.5 for water heaters and gas system; 1.0 for all other components.

1.3 SUBMITTALS

A. Product Data: For each product indicated.

B. Delegated-Design Submittal: For vibration isolation and seismic-restraint calculations and details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Qualification Data: For professional engineer.

E. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in the NYCBC unless requirements in this Section are more stringent.

B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproved by ICC-ES, or preapproved by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

D. Acoustical Testing/Quality Assurance:
   1. The contractor shall cooperate with regard to sound tests (ARI 575, ANSI S1.13) which may be conducted by the Owner or his representative to verify that noise criteria are met. See Section for Vibration Testing and Noise Level Testing by Contractor.
   2. The contractor shall notify the Architect of any changes which will affect the acoustical performance.

1.5 WORKMANSHIP

A. Workmanship is critical in achieving the objective of noise control and it is critical that all noise control work must be installed in good workmanship like manner.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amber/Booth Company, Inc.
2. Kinetics Noise Control.
3. Mason Industries.
4. Vibration Eliminator Co., Inc.
5. Vibration Mountings & Controls, Inc.

B. Pads <MWP>: Arranged in multiple layers of sufficient stiffness for uniform loading over pad area, molded with a non-slip pattern sandwiching stainless steel –shim plates, and factory cut to sizes that match requirements of supported equipment. Minimum 5/16 inch thick pads, 12.5% strain, bridge bearing quality with durometer (Shore A scale) of 50.
   1. Resilient Material: Oil- and water-resistant neoprene.
   2. If the isolator is bolted to the structure, a neoprene vibration isolation washer and sleeve (Uniroyal Type 620/660, or as approved) shall be installed under the bolt head between the steel washer and the base plate.

C. Neoprene Mounts <ND>: Neoprene mountings shall have a minimum static deflection of 0.35"(9mm). All metal surfaces shall be neoprene covered and have friction pads both top and bottom. Bolt holes shall be provided on the bottom and a tapped hole and cap screw on top. Steel rails shall be used above the mountings under equipment such as small vent sets to compensate for the overhang. Mountings shall be type ND or rails type DNR as manufactured by Mason Industries, Inc.

D. Split Seals<SS> Split seals shall consist of pipe halves with minimum 3/4"(20mm) thick neoprene sponge cemented to the inner faces. The seal shall be tightened around the pipe to eliminate clearance between the inner sponge face and the piping. Concrete may be packed around the seal to make it integral with the floor, wall or ceiling if the seal is not in place prior to the construction of the building member. Seals shall project a minimum of 1"(25mm) past either face of the wall. Where temperatures exceed 240°F (115°C), 10 lb. density fiberglass may be used in lieu of the sponge. Seals shall be Type SWS as manufactured by Mason Industries, Inc

E. Restrained Spring Isolators <RSI>: Freestanding, steel, open-spring isolators with seismic restraint.
   1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
   2. Restraint: Seismic stops as required for equipment and authorities having jurisdiction.
   3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
   6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

F. Elastomeric Hangers <NH>: Double-deflection type, fitted with molded, oil-resistant elastomeric isolator elements bonded to steel housings with threaded connections for hanger rods. Color-code or otherwise identify to indicate capacity range.
   1. The diameter of the clear hole in the hanger box shall be at least 3/4 inch larger than the diameter of the hanger rod and permit the hanger rod to swing through a 30 degree arc. When installed, the hanger box shall be allowed to rotate through a full 360 degrees

without encountering any obstructions. Neoprene shall be bridge-bearing quality with a maximum durometer (Shore A scale) of 50.

2. Neoprene shall be bridge-bearing quality with a maximum durometer (Shore A scale) of 50.
3. Unless otherwise specified, the static deflection of DDNH hangers shall be 0.25 inches with a strain not exceeding 12.5%.

G. Spring Hangers <SPNH>: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
7. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.

H. Pipe Riser Resilient Support <RRA>: All-directional, acoustical pipe anchor consisting of 2 steel tubes separated by a minimum of 1/2-inch- (13-mm-) thick neoprene. Include steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions. Design support for a maximum load on the isolation material of 500 psig (3.45 MPa) and for equal resistance in all directions.

I. Resilient Pipe Guides <RRG>: Telescopic arrangement of 2 steel tubes or post and sleeve arrangement separated by a minimum of 1/2-inch- (13-mm-) thick neoprene. Where clearances are not readily visible, a factory-set guide height with a shear pin to allow vertical motion due to pipe expansion and contraction shall be fitted. Shear pin shall be removable and re-insertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

J. Flexible Stainless Steel Hoses <FSS>

1. Flexible stainless steel hose shall have stainless steel braid and carbon steel fittings. Sizes 3"(75mm) and larger shall be flanged. Smaller sizes may have male nipples. Minimum lengths shall be as tabulated:
2. Flanged
   a. (3", 4") x12"
   b. 6"x12"
3. Male Nipples
   a. (½, ¾", 1", 1-1/4", 1-1/2" and 2") x12"
   b. 2-1/2"x18"
4. At equipment, hoses shall be installed on the equipment side of the shut-off valves horizontal and parallel to the equipment shafts wherever possible. Hoses shall be type FFL or type MN as manufactured by Mason Industries, Inc.
5. At acoustic joint with three resilient hangers on quiet side of joint.

2.2 PIPE LAGGING

A. Acoustical performance shall be established by ASTM E413 and E90 procedures. Insertion loss, Transmission loss and STC data shall be supplied that meets or exceeds requirements established later in this Specification.

B. Where indicated on the drawings, pipe shall be wrapped with a minimum 2" thick glass or mineral fiber blanket with a minimum 3.0 lb/ft3 density, and a mass loaded vinyl sheet covered with an aluminum foil jacket. Complete system shall provide a minimum STC-23 as measured in an independent accredited acoustical laboratory in accordance with ASTM E90 and E413. Insertion Loss data indicating an IL Insertion Loss value of 25 at 500 Hz. shall also be submitted.

C. Manufactures:
1. Kinetics Noise Control, Inc.
2. Childers Products Company
3. Acoustical Duct & Pipe Lag from Sound Seal, a division of United Process, Inc.
4. The Proudfoot Company, Inc.

2.3 SEISMIC-RESTRAINT DEVICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

1. Amber/Booth Company, Inc.
2. California Dynamics Corporation.
3. Cooper B-Line, Inc.; a division of Cooper Industries.
4. Hilti, Inc.
5. Kinetics Noise Control.
6. Loos & Co.; Cableware Division.
7. Mason Industries.
8. TOLCO Incorporated; a brand of NIBCO INC.
9. Unistrut; Tyco International, Ltd.

D. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

E. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

F. Restraint Cables: ASTM A 603 galvanized or ASTM A 492 stainless-steel cables with end connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.

G. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or Reinforcing steel angle clamped to hanger rod.

H. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

I. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

J. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.2 GENERAL:

A. No plumbing piping, fixture, ceiling suspension wires or other elements of the building construction shall be attached to or abutted against the duct, piping and conduit systems.

B. Where ducts or piping penetrate walls, ceilings and floors of the occupied spaces, or ceiling void partitions or acoustically rated elements whether shown on the drawings or not, acoustically seal the penetration.

C. Contain rough-in of piping within stud wall cavities no less than 1/4-inch from the plane of the studs and 1 inch from gypsum board or other wall sheathing.

3.3 VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Equipment Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inches (3.2 mm).
2. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

B. Piping Restraints:

1. Comply with requirements in MSS SP-127.
2. Space lateral supports a maximum of 40 feet (12 m)o.c., and longitudinal supports a maximum of 80 feet (24 m) o.c.
3. Brace a change of direction longer than 12 feet (3.7 m).

C. Install cables so they do not bend across edges of adjacent equipment or building structure.

D. Install seismic-restraint devices using methods approved by acceptable to authorities having jurisdiction providing required submittals for component.

E. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

F. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

G. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Division 22 Section "Domestic Water Piping" for piping flexible connections.

3.5 SOUND PROOFING OF CONSTRUCTION

A. Required for penetrations of ductwork, pipes, and conduits through walls, floors and ceilings of mechanical rooms, electrical rooms with transformers, and Sound-Critical Spaces as called out in Acoustical Performance Section 1.01 of this Specification, as well as those walls, floors, and ceilings indicated on the drawings.

B. The Contractor shall ensure that the sound control performance of structures be maintained in accordance with the drawings and specifications. All penetrations shall be installed in a manner that results in complete air tightness through structure. If a condition occurs where penetration of the structure by a duct, pipe, conduit, etc., is not shown clearly on the drawings (or described in the specifications), the Contractor shall ask immediately for clarification of the method necessary to install the particular item.

C. Penetrations of Single-Wythe Masonry and Concrete Constructions

1. Pipe diameter = 1" or larger:
   a. Install a metal sleeve at the penetration. Size the sleeve to allow for 1/2" Armaflex lining and normal pipe clearances. Line the sleeve with 1/2" thick Armaflex II Sheet Insulation (or equal).
   b. Install pipe/conduit through lined sleeve and seal airtight with acoustical sealant or fire-rated acoustical sealant (3M Corporation CP 25 or equal) if partition is fire-rated.
   c. Do not rigidly secure pipe/conduit to wall with angles.
2. Pipe diameter < 1":
   a. Wrap pipe/conduit with 1/2" thick Armstrong Self-Seal Armaflex 2000 Pipe Insulation (or equal). Extend wrapping a minimum of 2" beyond the width of the partition on either side.
   b. Grout tightly to the Armaflex cover on the pipe/conduit.
   c. Trim Armaflex to the width of the partition, and seal airtight with acoustical sealant or fire-rated acoustical sealant (3M Corporation CP 25 or equal) if partition is fire-rated.
3. Use of spilt seals in lieu of Armaflex wrap where approved by acoustic consultant.
4. Provide flexible connection on noisy side of if crossing acoustic joint.

D. Penetrations of Single Stud Drywall Constructions
1. Conduit diameter = 1" or larger:
   a. Wrap with 1/2" thick Armstrong Self-Seal Armaflex 2000 Pipe Insulation (or equal). Extend wrapping a minimum of 2" beyond the width of the partition on either side.
   b. Install a metal pipe sleeve around the Armaflex wrap.
   c. Install the drywall around the sleeve and spackle tightly to full thickness of partition.
   d. Trim Armaflex and sleeve to the width of the partition, and seal airtight with acoustical sealant or fire-rated acoustical sealant (3M Corporation CP 25 or equal) if partition is fire-rated.
2. Conduit diameter < 1":
   a. Wrap with 1/2" thick Armstrong Self-Seal Armaflex 2000 Pipe Insulation (or equal). Extend wrapping a minimum of 2" beyond the width of the partition on either side.
   b. Install the drywall tight to the Armaflex wrap.

c. Trim Armaflex to the width of the partition, and seal airtight with acoustical sealant or fire-rated acoustical sealant (3M Corporation CP 25 or equal) if partition is fire-rated.

3. Multiple Pipe Penetrations
   a. Where a series of duct, conduits or pipes are penetrating the wall/floor/ceiling, each duct/conduit/pipe shall be separated by minimum 4" in all directions.
   b. Multiple duct/pipe/conduit penetrations at one location (i.e., one large opening for a series of pipe runs) is not recommended.
4. Penetrations of Double-Wythe Masonry/Concrete and/or Double Stud Drywall and/or Combination Constructions
   a. Use same techniques described above EXCEPT do not bridge the two studs or wythes with solid members such as sleeves or stud frames. Each sleeve or frame must be completely separate for each individual wythe or stud.
5. Use of spilt seals in lieu of Armaflex wrap where approved by acoustic consultant.
6. Provide flexible connection on noisy side of if crossing acoustic joint.

3.6 SERVICES PENETRATIONS

A. Pipe: Where pipe penetrates acoustical partitions, provide acoustic seal around the piping.

3.7 ELECTRICAL CONNECTIONS:

A. All isolated equipment to be connected with long lengths of flexible steel conduit from junction box, type depending on environment.

3.8 VIBRATION-CONTROL INSTALLATION

A. General
   1. Comply with requirements in Division 07 Section "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.
   2. Level vibration isolated equipment under rated design operating conditions while maintaining the isolation criteria. Isolators shall be plumb and aligned to preclude misalignment or undesired contact during operation

B. Equipment Restraints:
   1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).

C. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

D. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

E. Drilled-in Anchors:
   1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid pre-stressed tendons, electrical and telecommunications conduit, and gas lines.

2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.

Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice.
3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. After the entire installation is complete, and under full operational load, the isolators shall be adjusted so that the load is transferred from the block to the isolators. Ensure all debris from beneath the equipment the equipment and verify there are no short circuits of the isolation. The equipment shall be free in all directions.
5. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
6. Test to 90 percent of rated proof load of device.
7. Measure isolator restraint clearance.
8. Measure isolator deflection.
9. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

C. Remove and replace malfunctioning units and retest as specified above.

D. Prepare test and inspection reports.

3.10 ADJUSTING

A. Adjust isolators after piping system is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust active height of spring isolators.

D. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.11 PLUMBING VIBRATION-CONTROL DEVICE SCHEDULE

A. Supported or Suspended Equipment:

Item / Equipment	Location & Mounting	Isolation Type	Min. Deflection
Electric Water Heaters	MER , mounted on concrete base	ND	0.35 inch
Inline Pumps	Ceiling Hung	SPNH	1 inch
Base mounted pumps		RSI	1 inch
Piping (except fire protection)	All piping up to 3/4 inch in MER Room # plus 5 hangers downstream of MER room. All piping equal to or greater than inch in MER Room # plus 5 hangers downstream of MER room. Across acoustic joint	NH SPNH FSS	0.5 inch 1 inch
Pipe Risers	Domestic Hot & Cold and Sanitary Waste piping	RRA, RRG	

END OF SECTION 22 0548

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SECTION 22 0553

PLUMBING IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. Provide labor, materials, equipment and services, and perform operations required for complete installation of Plumbing Identification and related work as indicated on the drawings and specified herein.

B. The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

C. Related Work Specified Elsewhere

1. Section 01 0000 – General Conditions

2. Addendum to General Conditions

3. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

4. Section 22 0503 - Pipes and Tubes for Plumbing Piping and Equipment.

5. Section 22 0700 – Plumbing Insulation.

6. Section 22 0523 – General-Duty Valves for Plumbing Piping.

7. Section 22 1100 – Facility Water Distribution.

8. Section 22 1300– Facility Sanitary Sewerage.

9. Section 22 1400 – Facility Storm Drainage.

10. Section 22 3400 – Gas-Fired Domestic Water Heater.

11. Section 22 4000 – Plumbing Fixtures.

D. Work Included: The work shall include, but not be limited to, the following:

1. Extent of plumbing identification work required by this section is indicated on drawings and/or specified in other Division 22 sections.

2. Types of identification devices specified in this section include:

a. Plastic Pipe Markers.
b. Plastic Tape.
c. Valve Tags.
d. Valve Schedule Frames.
e. Engraved Plastic-Laminate Signs.
f. Plastic Equipment Markers.
g. Plasticized Tags.

1.02 QUALITY ASSURANCE

A. Materials and work shall conform to the latest edition of reference specifications and industry standards listed below and specified herein and to applicable codes and requirements of local authorities having jurisdiction, whichever is more stringent.

1. ANSI Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.03 SUBMITTALS

A. Submit the following in accordance with the requirements specified under Submittals in Section 22 0500P.

1. Product Data: Submit copies of manufacturer's latest published literature for materials specified herein for approval; obtain approval before materials are delivered to the site. Data shall include manufacturer's technical product data and installation instructions for each identification material and device required.

2. Schedules: Submit valve schedule for each piping system; typewrite and reproduce on 8-1/2 inches by 11 inches bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shutoff and similar special uses, by special "flags", in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified.

3. Maintenance Data: Along with product data and schedules, submit manufacturers in maintenance manuals for maintaining identification work

specified herein.

E. Submit the following for LEED certification requirements.

1. Recycled Content Information:

a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.

c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.

d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly

2. Local/Regional Materials:

a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.

b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.

c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.

d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

3. Bio-based Materials:

a. Indicate type of bio-based material in product.

b. Indicate the percentage of bio-based content per unit of product.

c. Indicate relative dollar value of bio-based content product to total dollar value of product included in project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide mechanical identification materials manufactured by of one of the following:

1. Brady (W.H.) Co.; Signmark Div.

2. Seton Name Plate Corp.

3. Brimar

4. Bunting Graphics Inc

5. Approved Equal

2.02 MATERIALS

A. Mechanical Identification Materials: Provide manufacturer's standard products of categories and types required for each application as referenced in other Division 15 sections. Where more than single type is specified for application, selection is Commissioner's option, but provide single selection for each product category.

B. Plastic Pipe Markers

1. Snap-On Type: Provide manufacturer's standard preprinted, semi-rigid snap-on, color-coded pipe markers, complying with ANSI A13.1.

2. Pressure-Sensitive Type: Provide manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers with arrow tape banding both ends to indicate flow direction. Comply with ANSI A13.1.

3. Insulation: Furnish 1 inch thick molded fiberglass insulation with jacket for each plastic pipe marker to be installed on uninsulated pipes subject to fluid temperatures of 125 degrees F or greater. Cut length to extend 2 inches beyond each end of plastic pipe marker.

4. Small Pipes: For external diameters less than 6 inches (including insulation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location; fasten by one of the following methods:

a. Snap-on application of pretensioned semi-rigid plastic pipe marker.

b. Taped to pipe (or insulation) with color-coded plastic adhesive arrow tape, not less than 3/4 inch wide; full circle at both ends of pipe marker, lap tape 1-1/2 inches.

5. Large Pipes: For external diameters of 6 inches and larger (including insulation if any), provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length); fasten by one of the following methods:

   a. Laminated or bonded application of pipe marker to pipe (or insulation).

   b. Tape to pipe (or insulation) with color-coded plastic adhesive arrow tape, not less than 1-1/2 inches wide; full circle at both ends of pipe marker, lap tape 3 inches.

   c. Strapped-to-pipe (or insulation) application of semi-rigid type, with manufacturer straps or powerlock.

6. Lettering

   a. Comply with piping system nomenclature as specified, scheduled or shown, and abbreviate only as necessary for each application length.

   b. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

C. Plastic Tape

1. Provide manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.

2. Width: Provide 1-1/2 inches wide tape markers on pipes with outside diameters (including insulation, if any) of less than 6 inches, 2-1/2 inches wide tape for larger pipes.

3. Color: Comply with ANSI A13.1, except where another color selection is indicated.

D. Engraved Plastic-Laminate Signs

1. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated; punch for mechanical fastening except where adhesive mounting is necessary because of substrate.

   a. Thickness: 1/16 inch, except as otherwise indicated.

2. Fasteners: Self-tapping stainless steel screws, except contact-type

permanent adhesive where screws cannot or should not penetrate the substrate.

E. Plastic Equipment Markers

1. Provide manufacturer's standard laminated plastic, color coded equipment markers. Conform to the following color code:

   a. Green: Cooling equipment and components.

   b. Yellow: Heating equipment and components.

   c. Yellow/Green: Combination cooling and heating equipment and components.

   d. Brown: Energy reclamation equipment and components.

   e. Blue: Equipment and components that do not meet any of the above criteria.

   f. For hazardous equipment, use colors and designs recommended by ANSI A13.1.

2. Nomenclature: Include the following, matching terminology on schedules as closely as possible:

   a. Name and plan number.

   b. Equipment service.

   c. Design capacity.

   d. Other design parameters such as pressure drop, entering and leaving conditions, rpm, etc.

3. Size: Provide approximately 2-1/2 inches by 4 inches markers for control devices, dampers, and valves; and 4-1/2 inches by 6 inches for equipment.

F. Plasticized Tags: Manufacturer's standard preprinted or partially preprinted accident prevention tags, of plasticized card stock with matte finish suitable for writing, approximately 3-1/4 inches by 5-5/8 inches, with brass grommets and wire fasteners, and with appropriate preprinted wording including large size primary wording (as examples; DANGER, CAUTION, DO NOT OPERATE).

G. Lettering and Graphics

1. Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or

scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.

2. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 3, Air Supply No. 1H, Standpipe F12).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions at the job site where work of this section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.02 PREPARATION

A. Examine the Contract Drawings and specifications in order to insure the completeness of the work required under this Section.

B. Cooperate in the coordination and scheduling of the work of this Section with the work of related trades, so as not to delay job progress.

C. Where applying identification to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.03 INSTALLATION/APPLICATION

A. Ductwork Identification

1. Identify piping with duct markers; or provide stenciled signs and arrows, showing ductwork service and direction of flow, in black or white (whichever provides most contrast with ductwork color).

2. In each space where piping is exposed, or concealed only by removable ceiling system, locate signs near points where piping originates or continues into concealed enclosures (shaft, or similar concealment), and at 30 feet spacings along exposed runs.

3. Provide duct markers or stenciled signs on each access door indicating purpose of access to what equipment and other maintenance and operating instructions, and appropriate safety and procedural information.

4. Where access doors are concealed above acoustical ceilings or similar concealment, install plasticized tags for identification in lieu of specified signs, at Commissioner's option.

B. Piping System Identification

1. Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:

   a. Plastic pipe markers, with application system as indicated under "Materials" in this section. Install on pipe insulation segment where required for hot non-insulated pipes.

   b. Stenciled markers, black or white for best contrast, wherever continuous color-coded painting of piping is provided.

2. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.

   a. Near each valve and control device.

   b. Near each branch, excluding short takeoffs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.

   c. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.

   d. At access doors, manholes and similar access points which permit view of concealed piping.

   e. Near major equipment items and other points of origination and termination.

   f. Space intermediately at maximum spacing of 30 feet along each piping run, except reduce spacing to 25 feet or less in congested areas of piping and equipment.

   g. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

C. Plumbing Equipment Identification

1. Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide

signs for the following general categories of equipment and operational devices:

a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.

b. Meters, gauges, thermometers and similar units.

c. Fuel-burning units including boilers, furnaces, and heaters.

d. Pumps

e. Heaters

h. Tanks and pressure vessels.

i. Strainers, filters, humidifiers, water treatment systems and similar equipment.

2. Optional Sign Types: Where lettering larger than 1 inch height is needed for proper identification, because of distance from normal location of required identification, stenciled signs may be provided in lieu of engraved plastic, at Commissioner's option.

3. Lettering Size: Minimum 1/4 inch high lettering for name of unit where viewing distance is less than 2 feet, 1/2 inch high for distances up to 6 feet, and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 of size of principal lettering.

4. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

5. Optional Use of Plasticized Tags: At Commissioner's option, where equipment to be identified is concealed above acoustical ceiling or similar concealment, plasticized tags may be installed within concealed space to reduce amount of text in exposed sign (outside concealment).

3.04 ADJUSTING AND CLEANING

A. Relocate any plumbing identification device which has become visually blocked by work of this division or other divisions.

B. Clean face of identification devices, and glass frames of valve charts.

3.05 EXTRA STOCK

A. Furnish minimum of 5 percent extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.

B. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

END OF SECTION

SECTION 22 0700

PLUMBING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. This section specifies administrative and procedure requirements regarding electrical work. Additional requirements are specified in various sections of Division 16 and also may be required during the execution of work due to project conditions.

B. The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

C. Related Work Specified Elsewhere:

1. Section 01 0000 – General Conditions

2. Addendum to General Conditions

3. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

4. Section 22 0503 – Pipes and Tubes for Plumbing Piping and Equipment.

5. Section 22 0523 General-Duty Valves for Plumbing Piping.

6. Section 22 0553 – Identification for Plumbing Piping and Equipment.

7. Section 22 1100 – Facility Water Distribution.

8. Section 22 1300– Facility Sanitary Sewerage.

9. Section 22 1400 – Facility Storm Drainage.

10. Section 22 3400 – Gas-Fired Domestic Water Heater.

11. Section 22 4000 – Plumbing Fixtures.

1.02 WORK INCLUDED

A. Piping Insulation.

1.03 SUBMITTALS

A. Shop Drawings: Submit list of insulation to be used for each service.

B. Product Data: Manufacturer's latest published data for materials, "R" values and installation.

C. Provide BS&A or MEA numbers.

D. Submit the following for LEED certification requirements.

1. Recycled Content Information:

a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.

c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.

d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly

2. Local/Regional Materials:

a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.

b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.

c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.

d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component

per unit of product.

3. Bio-based Materials:

   a. Indicate type of bio-based material in product.

   b. Indicate the percentage of bio-based content per unit of product.

   c. Indicate relative dollar value of bio-based content product to total dollar value of product included in project.

4. Energy Efficiency:

   a. Meet or exceed the minimum ASHRAE 90.1 2004 requirements

5. Environmental Data

   a. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

   b. Reports for aquatic toxicity testing of lubricants in accordance with ASTM D6081.

1.04 QUALITY ASSURANCE

A. All insulating materials to be free of asbestos.

B. Comply with all requirements of ASTM for thermal and moisture transmission.

C. Provide insulation (including insulation jacket or facing and adhesives used to adhere the facing or jacket to the insulation) with non-combustible material meeting Code requirements and fire and smoke hazard ratings as tested by procedure ASTM E-84, National Fire Protection Association 255, and UL 723, not exceeding flame spread 25 and smoke developed 50. Adhesives, mastics, cements, etc. will not exceed the same component ratings.

D. All insulating products and coverings to be U.L. listed.

E. All insulating products shall have Greenguard Certification

PART 2 - PRODUCTS

2.01 PIPE INSULATION

A. Materials

1. When the temperature of a fluid falls within the following temperature ranges at any time during the system cycle, provide the insulation thickness indicated.

				Insulation Thickness In Inches for Pipe Sizes In Inches				
Service	Temp. Range °F	Material	Runouts*	1" and less	1¼" to 1½"	2" to 4"	5" to 6	8" and larger
Domestic Cold Water	-	Glass Fiber with PVC jacket (white or grey)	1/2	1	1	1	n/a	n/a
Domestic Hot water supply and return.	141 to 105	Glass Fiber with PVC jacket (white or grey)	1/2	1-1/2	1-1/2	2	n/a	n/a
Exposed Horizontal and Vertical Storm Water piping	---	Glass Fiber with PVC jacket (white or grey)	n/a	n/a	n/a	1	½"	½"
** Runouts is piping directly connected to a terminal unit and not exceeding 12'-0" in length.*								

B. Provide insulation thickness for steam metering equipment at the building service entry in accordance with Utility Company requirements.

C. Fiberglass Density: Fiberglass pipe insulation in equipment rooms and/or where exposed to be of the sectional type having 6 lbs./cu. ft. density. Other fiberglass insulation to be of the 1-piece type with at least 4 lbs./cu. ft. density.

D. Thermal conductivity of fiberglass to be .23 BTU/hr/inch/sq.ft./°F/at a mean temperature of 75°F.

F. Thermal conductivity of calcium silicate to be .32 BTU/hr/inch/sq.ft./°F/at a mean temperature of 100°F.

G. Insulation Jackets

Concealed pipes carrying fluids 105 degrees and above	Factory applied white fire retardant jacket, (ASJ), stapled and banded. Pipes banded with not less than 3

	bands per section.
Exposed pipes carrying fluids 105°F and above.	Factory or field applied white or gray PVC fire retardant jacket with PVC fittings.

1. Vapor jacket permeability to be 0.02 perms.

2. Jacket Puncture Resistance to be 50 units (Beach).

H. Fittings, Valves and Flanges

1. Where manufactured, use factory premolded fittings (of the same material and thickness as the pipe insulation) for fittings, flanges and valves.

2. Where premolded insulation fittings are not manufactured, insulate fittings, flanges and valves with mitered segments of the same density as the adjoining pipe covering.

2.02 EQUIPMENT INSULATION

A. Materials

SERVICE	MATERIAL	INSULATION THICKNESS (inches)
Hot water expansion tanks	Glass Fiber Board, or Calcium Silicate	1

2.03 ACCEPTABLE MANUFACTURERS

A. Insulation

1 Owens-Corning Fiberglass

2. Johns-Manville

3. Armstrong

4. Certain-Teed

5. Approved Equal

6. 3M

B. Adhesives and Sealers

1. Benjamin Foster (H.B. Fuller Co.)

2, Rubatex

3. Minnesota Mining and Mfg. Co. (3M)

4. 3M

5. Approved Equal

PART 3 - EXECUTION

3.01 INSTALLATION OF INSULATION - GENERAL

A. Perform work in strict accordance with the manufacturer's recommendation and the best practice of the trade and the intent of this specification.

B. Apply insulation over clean dry surface, butting sections or surfaces firmly together and finishing as specified.

C. Seal vapor barriers in a continuous manner throughout against moisture penetration.

D. Insulation to be continuous through wall, floor and ceiling openings or sleeves. Do not cover any nameplates or identification tags.

3.02 PIPING INSULATION

A. Fill surface imperfections such as chipped edges, small joints or cracks and voids or holes with insulation material and smooth all such areas with a skim coat of insulating cement.

B. No insulation must be installed at fittings and joints until the piping systems have been hydrostatically tested as specified elsewhere to the satisfaction of the Commissioner.

C. Provide insulation for removable flanges of pipe strainers on cold services with built-up sections of glass fiber pipe covering, arranged to facilitate servicing of the strainer. Complete applications with vaporseals. Vapor barriers to be sealed and continuous through hangers, walls, sleeves, etc. Adhesives and coatings to be as noted herein.

D. Insulate fittings, flanges, valves, etc. for services where calcium silicate insulation is specified with mineral wool cement of equal thickness to the pipe insulation and finished with glass cloth.

3.03 INSPECTION

A. Apply prefabricated sectional insulation for straight pipes neatly fitted around the piping, and sealed with adhesive. Apply adhesive to only one side of each joint and not to pipe surface.

F. Seal all joints with Foster 30-35 fire resistant vapor barrier mastic. Where required, oversized pipe sections or board type insulation may be used to fabricate and install insulation around pipe specialties. All void space must be firmly filled with flexible insulation to support oversized pipe insulation.

G. Secure sectional insulation with 0.02" thick by ½" wide aluminum bands manufactured by Childers, or Thomas & Betts "TY-RAP" nylon ties, on 24" centers for pipe sizes 2" and larger. Install at least two (2) bands per section of insulation.

H. Insulate cold water ball valves with 3/4" thick flexible elastomeric sheet insulation (ASTM C534) or approved equal as detailed on the Drawings. Finish insulation with two (2) coats of Rubatex 374 coating.

I. Insulate cold water vertical riser support clamps.

J. Insulate and thoroughly vapor seal control valve bodies where the valve actuator penetrates the insulation.

K. Replace any self-sealing insulation and/or lap that is found to be not sealing properly. Do not use staples to secure the insulation, lap, or coverings.

3.04 FINISHING OF INSULATION

A. Finish hot service pipe fittings and valve applications with open weave glass mesh adhered with I.C. 501 (or BF 30-35). Vaporseal for cold applications with I.C. 501 (or BF 30-35) adhesive with open weave glass mesh laid in while wet with final coat with I.C. 501 (or BF 30-35) adhesive. Overlap glass mesh and outer coat adjacent covering by at least 2 inches. Do not insulate flanges until systems are operational.

3.05 PROTECTION OF INSULATION

A. Protect pipe covering at hangers, guides, and roller supports with 16 gauge galvanized metal shields or saddles (at least 3 times the insulation diameter in length and 1/3 the insulation circumference in width) on the outside of the insulation and vapor barrier. Hold shields in place with straps. Do not pierce the insulation with hangers. Where glass fiber insulation is used on piping 3 inches and larger, provide half-section of calcium silicate covering of equal thickness at metal shields.

END OF SECTION

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SECTION 220800

COMMISSIONING OF PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

B. The OPR and BOD documentation are included by reference for information only.

C. Division 01 section 'LEED Requirements' for additional LEED requirements.

1.2 SUMMARY

A. This section includes commissioning process requirements for Plumbing systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DESCRIPTION

A. Refer to Division 01 Section "General Commissioning Requirements" for the description of commissioning.

1.4 DEFINITIONS

A. Refer to Division 01 Section "General Commissioning Requirements" for definitions.

1.5 SUBMITTALS

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's role.

B. Refer to Division 01 Section "Submittals" for specific requirements. In addition, provide the following:

C. Certificates of readiness

D. Certificates of completion of installation, prestart, and startup activities.

E. O&M manuals

F. Test reports

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the contractor for the equipment being tested. For example, the plumbing contractor of Division 22 shall ultimately be responsible for all standard testing equipment for the plumbing system in Division 22, except for equipment specific to and used by TAB in their commissioning responsibilities. A sufficient quantity of two-way radios shall be provided by each subcontractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the Commissioner

C. and left on site, except for stand-alone data logging equipment that may be used by the CxA.

D. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the Commissioner upon completion of the commissioning process.

E. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the Commissioner.

F. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the installing contractors, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems

B. **Red-lined Drawings:** The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. **Operation and Maintenance Data:** Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been mad by the contractor.

D. **Demonstration and Training:** Contractor will provide demonstration and training as required by the specifications. A complete training plan and schedule must be submitted by the contractor to the CxA four weeks (4) prior to any training. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.

B. Attend construction phase controls coordination meetings.

C. Attend domestic water balancing review and coordination meetings.

D. Participate in Plumbing systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.

G. Prepare preliminary schedule for Plumbing system orientations and inspections, operation and maintenance manual submissions, training sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for Commissioner. Distribute preliminary schedule to commissioning team members.

H. Update schedule as required throughout the construction period.

I. Assist the CxA in all verification and functional performance tests.

J. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

K. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.

L. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

M. Notify the CxA a minimum of two weeks in advance of the time for start of the balancing work. Attend the initial balancing meeting for review of the balancing procedures.

N. Participate in, and schedule vendors and contractors to participate in the training sessions.

O. Provide written notification to the CM/GC and CxA that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.
1. Plumbing equipment including domestic water heaters, pumps, and all other equipment furnished under this Division.
2. Gas piping, sanitary waste and vent piping, storm drainage piping, sump pumps and automatic sprinkler system.
3. Fire stopping in fire rated construction, including caulking, gasketing and sealing of smoke barriers.

P. The equipment supplier shall document the performance of his equipment.

Q. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

R. Balance Contractor
1. Attend initial commissioning coordination meeting scheduled by the CxA.
2. Submit the site specific balancing plan to the CxA and Commissioner for review and acceptance.
3. Attend the balancing review meeting scheduled by the CxA. Be prepared to discuss the procedures that shall be followed in balancing the Plumbing system.
4. At the completion of the balancing work, and the submittal of the final balancing report, notify the Plumbing contractor and the CM/GC.
5. At the completion of balancing work, and the submittal of the final balancing report, notify the Plumbing Contractor and the CM/GC.
6. Participate in verification of the balancing report, which will consist of repeating measurements contained in the balancing reports. Assist in diagnostic purposes when directed.

S. Equipment Suppliers
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Commissioner, to keep warranties in force.
2. Assist in equipment testing per agreements with contractors.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

T. Refer to Division 01 Section "General Commissioning Requirements" for additional contractor responsibilities.

3.3 COMMISSIONER'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Commissioner's Responsibilities.

3.4 COMMISSIONER'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Commissioner's Responsibilities.

3.5 CxA'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's Responsibilities.

3.6 TESTING PREPARATION

A. Certify in writing to the CxA that Plumbing systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that Plumbing instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.7 DOMESTIC WATER BALANCING VERIFICATION

A. Prior to performance of Domestic Water Balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Notify the CxA at least ten (10) days in advance of testing and balancing Work, and provide access for the CxA to witness balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of Plumbing systems at the direction of the CxA.

1. The CxA will notify testing and balancing subcontractor ten (10) days in advance of the date of field verification. Notice will not include data points to be verified.
2. The balancing subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
3. Failure of an item includes a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final balancing report.
4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.8 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of Plumbing testing shall include entire Plumbing installation. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Plumbing contractor, balancing subcontractor shall prepare detailed testing plans, procedures, and checklists for Plumbing systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the Plumbing system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.9 PLUMBING SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. **Equipment Testing and Acceptance Procedures:** Testing requirements are specified in individual Division 22 sections. Provide submittals, test data, inspector record, and certifications to the CxA.

B. **Plumbing Instrumentation and Control System Testing:** Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.

C. **Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment:** Test requirements are specified in Division 22 piping Sections. Plumbing Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
3. Minimum flushing water velocity.
4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. **Plumbing Distribution System Testing:** Provide technicians, instrumentation, tools, and equipment to test performance of air, fuel gas, sanitary waste and vent piping, storm drainage piping, sprinkler and domestic water distribution systems.

E. **Vibration and Sound Tests:** Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

F. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:

1. Domestic Hot Water System
2. Gas- Fired Domestic Water Heater
3. Gas System – Natural Gas
4. Hot Water Circulating Pump
5. Sprinkler System

3.10 DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.

3.11 APPROVAL

A. Refer to Division 01 Section "General Commissioning Requirements" for approval procedures.

3.12 DEFERRED TESTING

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deferred testing.

3.13 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.

B. Refer to Division 01 Section "General Commissioning Requirements" for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.14 TRAINING OF CITY OF NEW YORK PERSONNEL

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to training.

END OF SECTION 220800

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SECTION 22 1100

FACILITY WATER DISTRIBUTION

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 City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2 DESCRIPTION

A. Provide all labor, materials and equipment required to furnish, deliver and install all work under this Section as required by the Contract Drawings and as specified herein.

B. Provide, install and perform all operations required for the complete installation of all piping specialties included but not restricted to the following:

1. Nipples and couplings.
2. Dielectric fittings.
3. Water meter.
4. Hose Stations.
5. Pressure gauges.
6. Thermometers.
7. Water Hammer Arrestor.
8. Non-Freeze hydrants.
9. Vacuum breakers.

10. Washing Machine Kit.

11. Post Hydrants.

1.3 RELATED DOCUMENTS

A. Drawings and General Provision of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section. Attention is directed to other Sections of these specifications which affect work of this Division.

1.4 WORK INCLUDED IN OTHER SECTIONS

A. Section 01 0000 – General Conditions

B. Addendum to General Conditions

C. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

D. Section 22 0503 – Pipes and Tubes for Plumbing Piping and Equipment

E. Section 22 0523 – General-Duty Valves for Plumbing Piping

F. Section 22 0553 – Identification for Plumbing Piping and Equipment.

G. Section 22 0700 – Plumbing Insulation.

H. Section 22 1300– Facility Sanitary Sewerage.

I. Section 22 1400 – Facility Storm Drainage.

J. Section 22 3400 – Gas-Fired Domestic Water Heater.

K. Section 22 4000 – Plumbing Fixtures.

1.5 SUBMITTALS

A. Submit shop drawings in accordance with Section 220500, General Conditions and addendum to General Conditions for all items specified in this section.

PART 2- PRODUCTS

2.1 NIPPLES AND COUPLINGS

A. Extra heavy pipe shall be used for nipples where the unthreaded portion is less than 1-1/2 inches in length.

B. Close nipples will not be permitted; only shoulder nipples shall be used.

C. Right and left couplings are restricted to water and gas pipe 1-1/4 inches and smaller.

D. Brass ground joint unions are restricted to water pipe 1-1/2 inches and smaller.

2.2 DIELECTRIC FITTINGS

A. Provide dielectric insulating couplings which effectively isolate ferrous from non-ferrous piping as manufactured by Lochinvar Corp., Eclipse Inc., Watts Regulator Co

2.3 WATER METER

A. Provide electromagnetic water meter approved by NYC DEP.

B. Manufacturers:
Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Elster (Amco).
2. Actaris.
3. Metron-Farnier.

C. Electromagnetic Meters:

1. Description: Elster evoQ4 Electronic.

2. Meter shall be provided with remote reading receptacle located as per Architect's direction.

3. Meter shall have provision for future AMR system.

2.4 HOSE STATIONS

A. HB-1: Where shown on the Contract Drawings provide Woodford Manufacturing Co. Model 24 C hose bibbs or approved equal. Finish shall be rough brass in mechanical room; finish shall be chrome plated in all other areas. Hose bibb shall be provided with integral or attached vacuum breaker.

B. HB-2: Where shown on the Contract Drawings provide thermostatic water mixer with ¾" inlets and outlets, thermostatic mixing valve, two stops and check valves, color coded handles, thermometer, vacuum breaker, hose connection and stainless steel hose rack similar to Leonard THS-25-VBD.

2.5 PRESSURE GAUGES

A. 4-1/2 in. diameter, black enamel cast aluminum case, black epoxy coated steel ring with shatterproof glass, stainless steel movement with bronze pinion and segment shaft, similar to Ashcroft Type 1010.

B. Provide dial with suitable range, brass pressure scrubber, brass tee-handle cock.

C. Locate on water service, inlet and outlet of each backflow preventer, suction and discharge of pumps.

2.6 THERMOMETER

A. 4-1/2 in. diameter cast aluminum case, CP brass ring with heavy glass, vapor pressure or liquid actuated bronze Bourdon tube, adjustable angle or rigid union back or bottom connection with copper bulb, similar to Trerice No. V80742.

1. Locate on water heater, outlet of thermostatic tempering valve, HW return piping, and as noted.

2.7 WATER HAMMER ARRESTORS

A. Precision Plumbing Products (PPP, Inc.), J.R. Smith or approved equal. ASTM B 88, Type "K" hard drawn copper body, brass piston and threaded connector. Seal lubricant to be Federal Food and Drug Administration approved for use in potable water systems.

2.8 NON FREEZE HYDRANT

A. Wall type (exterior wall): Chrome plated wall hydrant with hot and cold water inlets and loose keys, Model C 22 manufactured by Woodford or approved equal. Wall hydrant shall be provided with integral or attached vacuum breaker.

B. Manufacturers: Woodford, J.R.Smith, Zurn, Wade.

2.9 VACUUM BREAKERS

A: Bronze body, chrome-plated, similar to Watts, Regulator Co. Model No. 288A-C, Provide check valve at the outlet side of vacuum breaker.

B. Vacuum breaking devices shall be readily accessible, in the same room with the fixture they serve.

C. Provide vacuum breakers for hose and faucets, on piping supplying fixtures and equipment below the overflow level and interconnections with other systems which as make-up water supplies to heating or cooling systems.

D. Manufacturers: Watts, Wilkins, Conbraco or approved equal.

2.10 WASHING MACHINE AUTOMATIC SHUT-OFF KIT AND BASIN:

A. Washing machine automatic shut-off kit shall be FloodStop kit Model FS3/4H-90 or approved equal, including two ball valves with hammer arrestors, two automatic motorized ball valves, water sensor, control unit, wall box, adaptor, mounting hardware and power cord with transformer.

B. Washing machine shall be provided with drainless basin 27"x32" manufactured by FloodSaver or approved equal.

2.10 POST HYDRANT:

A. Post Hydrant: (free standing): Non-freeze Post Hydrant with Galvinized Casing and adjustable Flow Wheel Lock Handle, similar to J.R.smoth Model 5909.

B. Wall hydrant shall be provided 1/8" NPT drain hole in valve casting.

C. Valve housing shall be located 4.5 ft below ground.

D. Manufacturers: Woodford, Zurn, Wade.

PART 3- EXECUTION

3.1 INSTALLATION

A The bellows element of expansion joints shall be protected from damage, dents, scores, arc, strikes, weld spatter and other damage can cause the joint to fall. Damage joints should not be used. Anchors, guides and support must be installed and tested in accordance with code and manufacturer requirements.

B Apply the heater linearly for heat tracing on the pipe after piping has been successfully tested. Secure the heater to piping with cable ties or fiberglass tape and protect exposed ends from moisture during construction. Heat tracing shall be installed and tested in accordance with code and manufacturer requirements.

END OF SECTION

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SECTION 22 1300

FACILITY SANITARY SEWERAGE

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 City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2 DESCRIPTION

A. Provide all labor, materials and equipment required to furnish, deliver and install all work under this Section as required by the Contract Drawings and as specified herein.

B. Provide, install and perform all operations required for the complete installation of all piping specialties included but not restricted to the following:

1. Flashing.
2. Cleanouts.
3. Air vent.
4. Open receptor.
5. Traps
6. Trench Drains
7. Floor Drains
8. Neutralization Tank
9. Animal Hair/Fur Interceptor

1.3 RELATED DOCUMENTS

A. Drawings and General Provision of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section. Attention is directed to other Sections of these specifications which affect work of this Division.

1.4 WORK INCLUDED IN OTHER SECTIONS

A. Section 01 0000 – General Conditions

B. Addendum to General Conditions

C. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

D. Section 22 0503 – Pipes and Tubes for Plumbing Piping and Equipment

E. Section 22 0553 – Identification for Plumbing Piping and Equipment.

F. Section 22 0700 – Plumbing Insulation.

G. Section 22 0523 – General-Duty Valves for Plumbing Piping.

H. Section 22 1100 – Facility Water Distribution.

I. Section 22 1400 – Facility Storm Drainage.

J. Section 22 3400 – Gas-Fired Domestic Water Heater.

K. Section 22 4000 – Plumbing Fixtures.

1.5 SUBMITTALS

A. Submit shop drawings and submittals for all products specified in this section.

PART 2- PRODUCTS

2.1 FLASHING

A. Copper flashing shall have a minimum weight of not less than 16 ounces per square foot, complying with ANSI/ASTM B-370.

B. Lead flashing shall have a minimum weight of not less than 4 pounds per square foot, complying with ANSI/ASTM B-29.

C. Flashing fittings for pipes through roof shall be galvanized cast iron fitting with counter flashing recess, similar to Smith Figure 1740 or 1750. Extend flashing at least 18" square around pipe and 18" high.

D. Flashing for vent pipes through roof and roof drains shall extend a minimum of 24" square and around floor drains 24" square.

2.2 CLEANOUTS

A. Use "Y" (and "TY") fittings for cleanouts; full size "Y" for piping up to 4 inches and not less than 4-inch "Y" outlets for piping 5 inches and larger.

B. Provide easily accessible cleanouts to make entire drainage system accessible for rodding. Provide at least 18" clearance to permit access to cleanout plugs.

C. Provide cleanouts for storm and sanitary piping at bases of stacks, at changes in direction of horizontal piping, and at 50-foot intervals, minimum, on horizontal runs.

D. Where no definite finish is indicated on the Architectural and/or mechanical drawings, wall plates shall be chrome plates cast brass and floor plates shall be nickel bronze. Screws in cleanouts in finished areas shall be vandal proof.

E. Floor cleanout deckplates shall be the following or approved equals:

1. Unfinished areas: Jay R. Smith 4120 series
2. Finished areas: Jay R. Smith 4020 series
3. Tiled areas: Jay R. Smith 4140 or 4160 series
4. Carpeted areas: Jay R. Smith No. 4026-Y (with carpet marker)

F. Toilet room wall cleanouts shall be cast iron caulk ferrule and cast iron head seal plug with stainless steel cover and center screw; Jay R. Smith 4400 series.

G. Cleanouts at changes of direction of above-floor piping shall be cast iron caulk ferrule with straight threaded, tapered bronze plug; Jay R. Smith No. 4420 or approved equal.

H. All cleanout plugs shall be lubricated with graphite before installation.

I. Cleanouts shall be manufactured by Jay R. Smith Manufacturing Co., Josam Manufacturing Co., Zurn Industries Inc., Tyler Pipe Industries Inc./Wade Division, or approved equal.

2.3 AIR VENTS

A. At all points indicated on the drawings and whenever else required to assure the complete venting of all parts of the system, install automatic, float-operated air vents, Sarco No. 13-W, or approved equal capable of venting all air and at the same time preventing the escape of water . Provide valve on cock before each vent.

B. Each float-operated vent shall be provided with a suitable vent line carried to the nearest floor drain, slope sink or other approved point of discharge.

C. Access door shall be provided for installation by GC where access to vents is required.

2.4 STANDPIPE (OPEN RECEPTOR)

A. Shop or field fabricate from ASTMA A 74, service class, hub-and-spigot, cast-iron, soil-pipe fitting. Include P-trap (where connection is made to sanitary system), hub-and spigot riser section of length to provide depth indicated, and increaser fitting of size indicated, joined with ASTMC 564 rubber gaskets. Size P-Trap as indicated.

2.5 TRAPS

A. Each fixture and piece of equipment requiring connection to the drainage system shall be separately trapped by means of a water seal trap placed as required by Code.

B. All running traps on drains, etc., shall have inlet handhole cleanouts and brass plug cleanouts in bottom. Cast iron trap in ground shall have bottom cleanouts and shall be chromium plated cast brass.

C. Provide deep-seal trap where indicated on Contract Documents. Trap shall be cast iron or bronze, with inlet and outlet matching connected piping, clean out where indicated, and trap seal primer valve connection where indicated:

1. 2-inch: 4 inch minimum water seal
2. 2 ½ inch and larger: 5 inch minimum water seal

2.6 TRENCH DRAINS

A. Trench Drain TD: duco cast iron body with secured vandal proof hinged nickel bronze grate and sediment bucket, similar to J.R. Smith No. 2589-U-NB.

2.7 FLOOR DRAINS

A. Floor drain FD-1: cast iron body, flashing collar with nickel bronze adjustable strainer head similar to J.R. Smith No. 2010-A05NB.

B. Floor drain FD-2(mechanical rooms): cast iron deep body adjustable top and bar grade and sediment bucket, similar to J.R. Smith No. 2230-B.

C. Floor drain FD-3: duco cast iron body and flange with Acid Resistant Coated Interior, flashing clamp, nickel bronze integral grate and rim, fabricated stainless steel perforated bucket, J.R. Smith No. 2502C-C-SSB.

2.8 NEUTRALIZATION TANK:

A. High quality polyethylene or polypropylene one piece molded cylindrical tanks, with bolted and gasketed cover secured by type 304, 18-8 stainless steel bolts and nuts, complete with cover, gasket, bolts and nuts, interior dip tube and limestone chips, similar to Orion fittings, Inc.

B. Tank capacity: 5 gallons.

2.9 ANIMAL HAIR/FUR INTERCEPTOR:

A. Fabricated Steel with Gray Duco Coating and Stainless Steel Mesh Bucket, Stainless Steel Secondary Screen, 3/16" diamond plate secured and gasketed cover and 2' vent connection, similar to JR Smith Model SQ-8-2160.

B. Flow Rate: 10 gpm.

PART 3- EXECUTION

3.1 INSTALLATION

A. Locate drip pans under piping passing over or within 3 feet horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, weld rods to sides of drip pan. Brace to prevent sagging or swaying.

B: Install flashing on all drains set in membrane floors and roofs and all other areas as specified herein.

END OF SECTION

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SECTION 22 1400

FACILITY STORM DRAINAGE

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 City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2 DESCRIPTION

A. Provide all labor, materials and equipment required to furnish, deliver and install all work under this Section as required by the Contract Drawings and as specified herein.

B. Provide, install and perform all operations required for the complete installation of all piping specialties included but not restricted to the following:

1. Flashing.

2. Roof Drains.

1.3 RELATED DOCUMENTS

A. Drawings and General Provision of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section. Attention is directed to other Sections of these specifications which affect work of this Division.

1.4 WORK INCLUDED IN OTHER SECTIONS

A. Section 01 0000 – General Conditions

B. Addendum to General Conditions

C. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

D. Section 22 0503 – Pipes and Tubes for Plumbing Piping and Equipment

E. Section 22 0553 – Identification for Plumbing Piping and Equipment.

F. Section 22 0700 – Plumbing Insulation.

G. Section 22 0523 – General-Duty Valves for Plumbing Piping.

H. Section 22 1100 – Facility Water Distribution.

I. Section 22 1300– Facility Sanitary Sewerage.

J. Section 22 3400 – Gas-Fired Domestic Water Heater.

1.5 SUBMITTALS

A. Submit shop drawings in accordance with Section 22 0500 for all items specified in this section.

PART 2- PRODUCTS

2.1 FLASHING

A. Copper flashing shall have a minimum weight of not less than 16 ounces per square foot, complying with ANSI/ASTM B-370.

B. Lead flashing shall have a minimum weight of not less than 4 pounds per square foot, complying with ANSI/ASTM B-29.

C. Flashing fittings for pipes through roof shall be galvanized cast iron fitting with counter flashing recess, similar to Smith Figure 1740 or 1750. Extend flashing at least 18" square around pipe and 18" high.

D. Flashing for vent pipes through roof and roof drains shall extend a minimum of 24" square and around floor drains 24" square.

2.2 ROOF DRAINS

A. Roof drain ERD-emergency roof drain: Duco cast iron body with combined flashing clamp and gravel stop with cast iron dome, sump receiver and underdeck clamp, adjustable solid extension and solid 3"water dam, similar to J.R.Smith No. 1010-R-C-WD03-CID.

B. Roof Drain RD: Duco cast iron body with adjustable extension sleeve, reversible collar, combined flashing clamp and gravel stop, sump receiver and underdeck clamp, vandal proof cast iron dome, J.R. Smith No.1015-CID-C-R-U or approved equal.

C. Area drain AD-1: Duco cast iron body with flashing collar and adjustable reinforced nickel bronze strainer head 6" in diameter, J.R.Smith No. 2010-C06NB.

PART 3- EXECUTION

3.1 INSTALLATION

A: Install flashing on all drains set in membrane floors and roofs and all other areas as specified herein.

END OF SECTION 22 1400

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SECTION 22 3400

FUEL-FIRED DOMESTIC WATER HEATERS

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 City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2. DESCRIPTION OF WORK

A. Provide as necessary for a complete system of plumbing equipment, as indicated on the Drawings and as specified.

1.3. WORK INCLUDED IN OTHER SECTIONS

2. Section 01 0000 – General Conditions

3. Addendum to General Conditions

4. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

5. Section 22 0503 – Pipes and Tubes for Plumbing Piping and Equipment.

6. Section 220548 – Vibration and Seismic Control

7. Section 22 0553 – Identification for Plumbing Piping and Equipment.

8. Section 22 0700 – Plumbing Insulation.

9. Section 22 0523– General-Duty Valves for Plumbing Piping.

10. Section 22 1100 – Facility Water Distribution.

10.1. QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. American Gas Association (AGA).

2. American Society of Mechanical Engineers (ASME).

3. National Electrical Manufacturer's Association (NEMA).

PART 2 - PRODUCTS

2.1 GAS-FIRED WATER HEATERS

A. Furnish and install commercial water heater, condensing type, with extra high, at least 95%, thermal efficiency.

B. Storage capacity of the heater shall be 100 gal.

C. Recovery rating of the heater shall be 170 gallons per hour at 100 degree temperature rise.

D. Water heater shall meet thermal efficiency and standby loss requirements of the US Department of Energy and current edition of ASHRAE/IESNA 90.1.3.

E. Water heater shall be suitable for sealed combustion direct venting using 4" PVC air intake pipe and 4" PVC exhaust pipe for a total distance of 120 equivalent feet of vent and 120 equivalent feet of intake.

F. The heater shall be factory assembled and tested.

G. The control shall be an integrated solid state temperature and ignition control device with integral diagnostics.

H. The tank shall be foam insulated and equipped with a ASME rated temperature pressure relief valve.

I. Heater shall be provided with maintenance-free powered anode.

J. The water heater shall be UL listed.

K. Water Heater manufacturers: A.O. Smith, Rheem or approved equal.

L. Manufacturer's warranty: one year after substantial completion of plumbing work.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment in accordance with the manufacturer's printed recommendations.

B. Install water heater on 6" concrete house pad.

A. Provide valves at each piece of equipment to provide isolation of the equipment from its connected system.

B. Grout equipment base plates completely to provide a rigid-non-deflecting support

C. Provide nameplates attached to heater.

D. Provide acid neutralization tank for condensate discharge.

E. Provide expansion tank.

F. Provide hot water circulator with combination aquastat/timer.

END OF SECTION

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SECTION 22 4000

PLUMBING FIXTURES

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 City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2 DESCRIPTION

A. Provide plumbing fixtures New York State and New York City approved for water conservation and for handicap regulations.

B. Provide complete fixture assemblies, including all trim supports and appurtenances for proper operation and neat, finished appearance. Procure all rough-in data from manufacturer and rough-in and connect to fixtures as required.

1.3 WORK INCLUDED IN OTHER SECTIONS

A. Section 01 0000 – General Conditions

B. Addendum to General Conditions

C. Section 22 0500 – Common Work for Plumbing Piping and Equipment.

D. Section 22 0503 – Pipes and Tubes for Plumbing Piping and Equipment

E. Section 22 0553 – Identification for Plumbing Piping and Equipment.

F. Section 22 0700 – Plumbing Insulation.

G. Section 22 0523 – General-Duty Valves for Plumbing Piping.

H. Section 22 1100 – Facility Water Distribution.

1.4 QUALITY ASSURANCE

A. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture. Supply all equipment and accessories new, free from defects. All items of a given type shall be the product of the same manufacturer.

B. Requirements of Regulatory Agencies:

1. In all cases where FS, CS, ANSI, NF or other standards are indicated or required, products shall meet or exceed the standards established for material, quality, manufacture, and performance.

C. Reference Standards:

1. ANSI - American National Standards Institute.

2. ASSE - American Society of Sanitary Engineers.

3. CS - Commercial Standards, Commodity Standards Division, US Department of Commerce.

4. FS - Federal Supply Service, Standards Division, General Services Administration

5. NSF - National Sanitation Foundation.

1.5 SUBMITTALS

A. Drawings and Product Data: See Section 15010 for requirements and include the following:

Plumbing fixtures and faucets.

Plumbing fixture supplies.

Fixture supports.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Fixtures: Zurn, American Standard, Kohler, Eljer, Just, Elkay, Kroin or approved equal.

B. Flush Valves: Zurn, Sloan or Delaney.

C. Seats:

1. Olsonite
2. Church
3. Benecke
4. Approved Equal

D. Supplies:

1. American Standard
2. Kohler
3. Crane
4. Approved Equal

E. Stops:

1. American Standard
2. Kohler
3. Crane
4. Approved Equal

F. Traps:

1. American Standard
2. Kohler
3. Crane
4. Approved Equal

G. Fixture Supports:

1. Zurn
2. Smith
3. Josam

4. Wade

5. Approved Equal

2.2 MATERIALS

A. General:

1. Provide fixtures and trim complete for proper installation as described in the manufacturer's catalog.

2. All fixtures, specified to be of vitreous ware, shall be of a quality known commercially as "twice fired" vitreous chinaware of the best quality, nonabsorbent, burned so that the whole mass is thoroughly fused and vitrified producing a material white in color, which when fractured will show a homogeneous mass, close-grained and free from pores. The glazed and vitreous china fixtures shall be white, thoroughly fused and united to the body, without discoloration, chips, or flaws and shall be free from cracks. Warped or otherwise imperfect fixtures will not be acceptable.

3. Factory grind back and bases of fixtures smooth.

4. Enamelware to be white cast iron with acid-resisting enamel, unless otherwise noted.

5. Unless otherwise specified, water closets to have a waste passage to pass a 2-1/2 inch ball minimum. Bolt water closets to flanges with a 1-inch thick rubber foam gasket.

6. Fixture trim and exposed metal items shall be polished chrome-plated unless otherwise noted, and pipes passing through walls shall have polished chrome-plated escutcheon plates with set screw. All stainless steel shall be satin brushed (US32D) finish unless noted otherwise.

7. Fixtures shall be free from imperfections, true as to line, angles, curves, and color; smooth, watertight and practically noiseless in operation.

8. Exposed Pipe, Trim Including Fittings, Traps, Escutcheons, Valves, Valve Handles, and Accessories; Above and Below Fixtures:

a. Polished chrome plated CP brass.

b. Set-screw cast brass escutcheons for piping.

c. Traps: Cast brass with cleanout plugs.

d. Covering tubes not permitted.

9. Supply Fixtures With:

   a. Renewable seats or replaceable internal units.

   b. Compositional washers.

   c. All metal indexed handles.

   d. Screwdriver or lockshield stops.

   e. Insulate water supply and trap under lavatories for handicapped with Handi Lav-Guard as manufactured by Truebro, Inc. Ellington, CT (203) 872-0300.

   f. Insulate waste and trap receiving indirect waste from ice makers.

B. Plumbing Fixtures Schedule:

1. Water Closet – WC-1:

   a. Wall mounted, vitreous china elongated bowl, siphon jet flush action, 1.28 gallon per flush, 1-1/2 inch top spud Zurn Model Z 5615HET.

   b. Seat: Elongated, open front without cover, Olsonite Model 95.

   c. Support: concealed compact fixture support with vertical center line fitting, rear anchor foot assembly for stud walls, adjustable cast iron outlet nipple or coupling, impregnated felt or graphited asbestos gasket and steel supporting bolts with CP washers and cap nuts, similar to J.R.Smith Series Model 0440 or 0450.

   d. Flushometer: Exposed, battery powered, sensor operated water closet flush valve , 1-1/2" top spud connection and manual over ride button, Zurn Model ZTS6200EV.

2. Water Closet – WC-1H:

   a. ADA compliant, wall mounted, vitreous china elongated bowl, siphon jet flush action, 1.28 gallon per flush, 1-1/2 inch top spud Zurn Model Z 5615HET.

   b. Seat: Elongated, open front without cover, Olsonite Model 95.

   c. Support: concealed compact fixture support with vertical center line fitting, rear anchor foot assembly for stud walls, adjustable cast iron outlet nipple or coupling, impregnated felt or graphited asbestos gasket

and steel supporting bolts with CP washers and cap nuts, similar to J.R.Smith Series Model 0440 or 0450.

d. Flushometer: Exposed, battery powered, sensor operated water closet flush valve , 1-1/2" top spud connection and manual over ride button, Zurn Model ZTS6200EV.

c. Top of seat shall be set at 17"-19" above finished floor.

3. Lavatory LAV1:

a. Wall hung vitreous china, with concealed arm support; three faucet holes, rear overflow, American Standard Comrade Model 0124.131.

b. Faucet: polished chrome plated cast brass faucet body with integral shanks, slow-closing metering cartridges, centerline 4" long integral cast spout, vandal-resistant color-coded metal handles, water-conserving aerator reducing flow to 0.25 gallons per cycle (0.5 gpm), Zurn Model Z86500-CS-GH-3M.

c. Stops: Loose key, Quarter Turn, Straight Body Style or Angle Body Style as applicable, Inlet and Outlet compatible with faucet, Type OD Compression, Max Pressure 125 PSI, Temp Range 40 To 180 F, Material of Construction Brass, Chrome Plated Color/Finish, Standards IAPMO/UPC/SA Listed.

d. Strainer: Lavatory Strainer, Open Grid, Offset Tailpiece, Material of Construction Cast Brass, Color/Finish Chrome, Length 8 3/4 In., Gauge 17, Pipe Dia. 1 1/4 In., For Use With Sink Depth to 2 1/2 In, Connection Slip Joint, Standards cUPC, Includes Cast Brass Elbow.

e. Trap: Cast Brass, Chrome plated P-trap.

f. Support: J.R. Smith Model # 0700(27-M31) for use in plumbing shafts or J.R.Smith Fig. 0720 for use in areas with no plumbing shaft.

4. Lavatory LAV1-H:

a. ADA compliant, wall hung vitreous china, with concealed arm support; three faucet holes, rear overflow, American Standard Comrade Model 0124.131.

b. Faucet: single basin,polished chrome plated cast brass faucet body with integral shanks, slow-closing metering cartridges, centerline 4" long integral cast spout, vandal-resistant color-coded metal handles, water-conserving aerator reducing flow to 0.25 gallons per cycle (0.5 gpm), Zurn Model Z86100-CS-GH-3M.

c. Stops: Loose key, Quarter Turn, Straight Body Style or Angle Body Style as applicable, Inlet and Outlet compatible with faucet, Type OD Compression, Max Pressure 125 PSI, Temp Range 40 To 180 F, Material of Construction Brass, Chrome Plated Color/Finish, Standards IAPMO/UPC/SA Listed.

d. Strainer: Lavatory Strainer, Open Grid, Offset Tailpiece, Material of Construction Cast Brass, Color/Finish Chrome, Length 8 ¾ In., Gauge 17, Pipe Dia. 1 ¼ In., For Use With Sink Depth to 2 ½ In, Connection Slip Joint, Standards cUPC, Includes Cast Brass Elbow

e. Trap: Cast Brass, Chrome plated P-trap.

f. Support: J.R. Smith Model # 0700(27-M31) for use in plumbing shafts or J.R.Smith Fig. 0720 for use in areas with no plumbing shaft.

5. Shower SH-H:

a. Shower unit shall be ADA compliant, Zurn Temp-Gard III Model Z7301-SS-MT-DV2P-HW-H7-S8 or approved equal.

b. Shower unit shall include single balancing mixing shower unit, ceramic control cartridge with stainless steel balancing piston, built in reserve connection capability, two service stops/check stops, and adjustable limit stop.

c. All exposed trim and handle are metal with polished nickel chrome plated surface.

d. The valve is supplied with a two-way brass diverter valve, 2.0 gpm adjustable spray hand/wall showerhead in chrome finish. 60" flexible metal hose, 24" mounting slide bar wall connection, 1.75 gpm –S8 shower head, arm and flange in chrome plated finish. The valve body is a four port valve with a tub port plug. The valve inlets, shower and tub outlet are all standard with ½" NPT female thread connections.

6. Sink S1:

a. ADA compliant, Elkay "Lustertone" 17" x 20" x6", 18 gauge-type 302, self-rimming stainless steel counter top sink, Model # LRADQ-1720 with two holes 4" on center.

b. Polished chrome plated cast brass faucet body with integral shanks, slow closing metering cartridges, 5-3/8" swing gooseneck spout and vandal

resistant color coded metal handles, water conserving aerator which reduces flow to 0.25 gallons per cycle, Zurn Z866BO-CS.

c. Crumb cup strainer, with 1-1/2" offset tailpiece, Elkay Model #LK-35L

d. Adjustable 1-1/2" x 2" "P" trap with C.P. plug. 2" trap nipple and escutcheon

e. Loose key, cast brass, chrome plated, straight body or angle stop.

7. Sink S2:

a. Enameled cast iron with wall hanger and rim guard with drilled back for faucet, American Standard, Model 7695.008.

b. American Standard faucet with vacuum breaker and stops in shank, Model 8341.076, polished chrome plated, wall-mount.

c. American Standard cast iron "P" trap standard to wall and strainer for 3" pipe.

d. Loose key, cast brass, chrome plated, straight body or angle stop.

8. Sink S3:

a. Stainless Steel sink, 16 gauge, 304 SS, backsplash, Griffin Model H68-128 or approved equal.

b. American Standard faucet with vacuum breaker and stops in shank, Model 8341.076, polished chrome plated, wall-mount.

c. Crumb cup strainer, with 1-1/2" offset tailpiece, Elkay Model #LK-35L.

d. Adjustable 1-1/2" x 2" "P" trap with C.P. plug. 2" trap nipple and escutcheon

e. Loose key, cast brass, chrome plated, straight body or angle stop.

9. Drinking Fountain DF-H:

a. Two-level, wall mounted fully exposed, barrier-free, Stainless steel polished to lustrous satin finish, Elkay Model #EHWM217C.

b. Support: Elkay MPW200 in-wall plate and Elkay ML support legs.

b. C.P. "P" trap with C.O. plug.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Plumbing Fixtures:

1. Install fixtures as recommended by the fixture manufacturer except as shown differently on Drawings or where required by handicap codes.

2 Handicap lavatory P-trap and angle valve assemblies shall be insulated with white molded Truebro Inc. Handi Lav Guard insulation kit, secured with Snap-Clip flush fasteners, angle stop shall have Flap-Cap access cover.

3. Set fixtures level and equally spaced when installed in bank of more than two.

4. Rough-in supplies level, equally spaced and symmetrical with the fixture.

4. Rough-in wastes in alignment with the fixture drain. Off-setting trap and waste will not be acceptable. Install flush valves level with flush connections vertically. Offsetting and misalignment will not be acceptable.

5. Each fixture shall be separately trapped, using the type and size of trap required by the Plumbing Code.

6. Caulk all deck mounted trim at the time of assembly, including fixture and casework mounted. Caulk all self-rimming sinks installed in casework. The butted space between fixtures and the wall, counter or floor on which they are mounted shall be sealed with white acrylic plastic caulking compound.

7. Fixtures supplies and traps as specified, shall be chrome plated cast brass, where exposed to view. Where concealed from view in cabinets, etc., they may be rough brass.

10. Point up fixtures at joints with walls and floors with non-hardening Tile-Fix.

11. Cover exposed fixture fastening nuts and bolts with china bolt caps. Fill with putty.

12. Make up trim with care and with the proper tools in order that no tool marks show after installation.

13. Insulate waste pipe from electric water coolers up to connection to drainage system.

14. Install ½" chrome plated hose bibb with key operated, on cold water supply in each toilet room that has a floor drain.

B. Water Supplies:

1. Provide each water supply to each fixture, equipment or faucet with a stop in the branch connecting thereto. The stop shall be a screwdriver partition stop at finished wall locations and a rough brass globe valve at rough locations. Angle stops for deck mounted faucets shall have an IPS inlet. Fixtures requiring hot and cold water shall have the cold water faucet on the right hand side of the fixture and the hot water on the left hand side of the fixture.

2. Cover unoccupied fixture faucet holes with faucet hole covers.

3. Securely fasten screwed adapter fittings behind water supply stubouts to the structure.

4. Provide air chambers on cold and hot water supply to each fixture.

C. Waste Outlets: Bed strainers set in sanitary waste fixtures with glazing putty.

D. Supports:

1. Support wall-hung urinals, sinks and lavatories greater than 20-inch by 18-inch size by concealed chair carriers, commercial type, with block feet and thrust nuts. Securely anchor the carrier to the structure.

2. Bracket all other wall mounted fixtures to 12-gauge steel plates, fastened to face of steel studs, with metal screws, and with bracket screwed to backing.

3. Bolt chair carrier foot anchors and rear lugs to floor.

4. Coordinate wall dimensions required.

3.02 SPECIAL EQUIPMENT

A. Trim:

1. Provide pipe extension pieces, couplings, flanges, unions, cocks, valves, "P" traps, pressure reducing valves, gas pressure regulators, vents, wastes and all other trim required for proper operation which are not furnished integral with special equipment.

2. Control stops: Polished chrome plated, with loose key and stuffing box, at each water connection to each piece of equipment separately.

3. Traps: Cast brass, adjustable, polished chrome plated, with escutcheon and clean-out plug.

4. Wastes: Type M copper tubing to copper drainage fittings; polished chrome plated where exposed or in cabinets.

3.03 ADJUSTMENT AND CLEANING

A. Upon completion of work, all fixture and trimming shall be thoroughly cleaned and polished and free from all marks and left in first-class condition.

B. Upon completion of work, test flushometers and faucets for leaks and drips and adjust same for quiet and uniform operation.

END OF SECTION

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SECTION 230500
BASIC MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.1 DESCRIPTION

A. The project consists of animal care facility with support spaces. The project will be constructed in two phases. In phase I a new building adjacent to the existing building with will be constructed and commissioned and all animals and personnel moved in. In phase II the existing building will be demolished and the remainder of the new building will be completed.

B. The phasing separation is outlined on the drawings

C. The proposed heating and cooling system consist of packaged rooftop units and variable refrigerant volume split DX air cooled air conditioning. The surgical suite is provided with a packaged precision environmental control air conditioning unit

D. The requirements of this Section apply to all the Work of Division 23.

E. Provide a complete working installation with all equipment called for in proper operating condition. Documents do not undertake to show or list every item to be provided. When an item not shown or listed, is clearly necessary for proper operation of equipment which is shown or listed, provide an item which will allow the system to function properly at no increase in Contract Sum. Work shall include, but shall not be limited to, the following:

1.2 THE SCOPE OF WORK

A. The following is an outline cooling, heating and ventilation systems

1 The animal holding areas, support areas ventilation, heating and cooling consists of a gas fired, electric DX cooling, packaged rooftop unit incorporating energy recovery wheel.

2 The heating and cooling system for all other support spaces consists of variable volume refrigerant multi-zone heat pump system. Mitsubishi City-Multi system with heat recovery is the basis of design. The system consist of indoor units, outdoor condensing unit located on roof, heat recovery heat exchanger, refrigerant piping, fittings and associated controls.

B. Surgical suite unit consists of with a packaged precision environmental control air conditioning unit with preconditioned air supplied from rooftop unit RTU-3.

C. Hoisting and rigging of equipment and materials required to complete work of this section.

D. Vibration isolation

E. Complete air distribution system including low pressure ductwork, linear diffusers, registers, grilles, dampers, filter frames and filters at return air grilles in animal holding areas, etc.

F. Sheet metal work

G. Insulation

H. Identification

I. Cleaning and prime painting

J. Instruction manual and start up instructions.

K. Testing and balancing

L. Commissioning

M. Automatic temperature controls

1.3 RELATED WORK

A. Specified elsewhere: The following work, unless otherwise noted is not included in this section shall be performed in other sections:

B. Electric power wiring for all equipment. See division 26.

C. Provision for circuit breakers, testing and connections for control power wiring.

D. Concrete work, including concrete housekeeping pads and other pads and blocks for vibrating and rotating equipment, ductbank envelopes and cast in place manholes and handholes, except as part of an inertia base.

E. Cutting and patching of masonry, concrete, tile and other parts of structure, with the exception of drilling for hangers and providing holes and openings in metal deck.

F. Flashing of wall and roof penetrations.

G. Installation of access panels in floors, walls, furred spaces or above ceilings

H. Structural supports necessary to distribute loading from equipment to roof or floor , except as specified herein.

I. Foundation drainage systems and site drainage structures.

J. Thermal and sound insulation in partitions and ceilings.

1.4 QUALITY ASSURANCE

A. General:

1 All equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

2 All equipment and accessories new, free from defects.

3 Supply all equipment and accessories in compliance with the applicable

standards listed in this Section and with all applicable national, state and local codes.

4 All items of a given type shall be the product of the same manufacturer.

5 Install work by craftsmen skilled in trade involved and by apprentices as indicated in the general conditions.

B. Requirement of regulatory agencies:

1 In accordance with requirements of Division 1 and as specified herein.

2 Nothing in the Drawings or Specifications shall be construed to permit Work not conforming to applicable laws, ordinances, rules or regulations.

3 When Drawings or Specifications exceed requirements of applicable laws, ordinances, rules or regulations, Drawings and Specifications take precedence.

4 It is not the intent of Drawings and Specifications to repeat requirements of codes except where necessary for completeness or clarity.

5 If any of the requirements of the above are in conflict with one another, or with the requirements of this specification, the most stringent requirements shall govern.

6 New York City Building Code, New York Sate Energy Code, Reference Standards, NYC Fire Department Regulations.

7 Materials and equipment shall be manufactured, installed and tested as specified in latest editions of applicable publications, standards, rulings and determinations of:

8 Local and state building, plumbing, mechanical, electrical, fire and health department codes.

C. Codes and Standards

1 International Mechanical Code 1996 Edition

2 International Plumbing Code 1996 Edition

3 American Gas Association (AGA).

4 National Fire Protection Association (NFPA).

5 American Insurance Association (AIA) (formerly National Board of Fire Underwriters).

6 Occupational Safety and Health Act (OSHA)

7 Underwriter's Laboratories (UL).

8 Factory Mutual Association (FM).

National Electric Code (NEC)

Environmental Protection Agency (EPA)

National Bureau of Standards (NBS)

Owner's Insurance Underwriter.

All materials and equipment shall be listed by Underwriters" Laboratories (UL), and approved by ASME, ANSI, ASTM, AGA, and NEC for intended service.

Most recent editions of applicable specifications and publications of the following organizations form part of these Contract Documents.

American National Standards Institute (ANSI)

American Society of Mechanical Engineers (ASME)

National Electrical Manufacturers' Association (NEMA)

American Society for Testing and Materials (ASTM)

American Water Works Association (AWWA)

Plumbing and Drainage Institute (PDI)

American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)

Air Moving and Conditioning Association (AMCA)

Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

Air Conditioning and Refrigeration Institute (ARI)

Hydraulic Institute (HI)

Tubular Exchanger Manufacturer's Association (TEMA)

Thermal Insulation Manufacturers Association (TIMA)

Associated Air Balance Council (AABC)

A13.1 Scheme for Identification of Piping Systems

Manufacturers Standardization Society of the Valves & Fittings Industry (MSS)

Adhesive and Sealant Council (ASC)

American Society of Sanitary Engineering (ASSE)

American Welding Society (AWS)

Institute of Electrical and Electronic Engineers (IEEE)

35 Insulated Cable Engineers Association (ICEA)

36 Certified Ballast Manufacturers (CMB)

37 Illuminating Engineering Society (IES)

38 NEBB - National Environmental Balancing Bureau

39 Specific reference is made to following NFPA codes which contain an exceptionally high quantity of mechanical, electrical, and fire protection requirements.

40 No. 13- Installation of sprinkler systems

41 No. 14- Installation of standpipe and hose systems

42 No. 20- Installation of centrifugal fire pumps.

43 No. 30- Combustible Liquids

44 No. 45- Fire Protection for Laboratories

45 No. 70- National Electric Code

46 No. 72D- Proprietary Protective Signaling Systems

47 No. 72E- Automatic Fire Detectors

1.5 CONTRACT DOCUMENTS

A. Listing of Documents does not limit responsibility of determining full extent of work required by these Contract Documents. Refer to Architectural, HVAC, Plumbing and Fire Protection, Electrical, Structural, Site Utility and all other drawings and other sections that types of construction in which work shall be installed and work of other trades with which work of this section must be coordinated

B. Except where modified by a specific notation to the contrary; it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

C. Items referred to in singular number in Contract Documents shall be provided in quantities necessary to complete work.

D. Drawings are diagrammatic. They are not intended to be absolutely precise; they are not intended to specify every offset, fitting and component. The purpose of the document is to indicate systems concept, the main components of the systems, and the approximate geometric relationships. Based on the systems concept, the main components and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational

E. Information and components shown on riser diagrams, but not shown on plans, and vice versa, shall apply and be provided as if expressly required on both

F. Data that may be furnished electronically by the Architect (on compact disk, diskette, or otherwise) is diagrammatic. Such electronically furnished information is subject to the same limitation of precision as heretofore described. If furnished, such data is for convenience and generalized reference, and shall not be substitute for Architect's and Engineer's sealed or stamped construction documents.

1.6 CAD DISCS

A. CAD discs for HVAC, Plumbing, Fire Protection, or Electrical drawings will be furnished by Architect at Contractor's request.

1.7 REVIEW OF CONTRACT DOCUMENTS AND SITE

A. With the submission of his bid, Contractor shall give written notice to the Owner of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules or regulations of Authorities having jurisdiction, and any necessary items of work omitted. In the absence of such written notice it is mutually agreed that the Contractor has included the cost of all required items in his proposal for a complete project.

B. Contractor shall acknowledge that he has examined the Plans, Specifications and Site, and from his own investigations he has satisfied himself as to the nature and location of the work; the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials; availability of labor, water, electric power, roads and uncertainties of weather; the conformation and condition of the ground; the character, quality and quantity of surface and subsurface materials to be encountered; the character of equipment and facilities needed preliminary to and during the execution of the work; all federal, state, county, township and municipal laws, ordinances and regulations particularly those relating to employment of labor, rates of wages, and construction methods; and all other matters which can in any way affect work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with the available information concerning these conditions will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work.

C. The location and elevation of the underground utilities, such as sewers, electrical power, water piping, steam and steam condensate return piping, conduit, etc., is as exact as can be determined from available information and its accuracy cannot be guaranteed. Exact location and elevation of these services shall be verified prior to excavation or installation of any portion of the work indicated. Exercise special care when excavating at or near the general location of underground utilities to avoid damage to the utility services. The Contractors is responsible to insure worker safety.

D. The contractor shall also acknowledge having visited the site and examined conditions under which work must be performed including preparatory work done under other Sections or other Contracts or by the Owner. Report conditions to Architect. Do not proceed until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing conditions and preparatory work.

E. Owner assumes no responsibility for any understanding or representation made during or prior to the negotiation and execution of this Contract unless such understanding or

representations are expressly stated in the Contract, and the Contract expressly provides that the responsibility, therefore, is assumed by the Owner.

1.8 MODIFICATIONS IN LAYOUT

A. HVAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show exact routings and locations needed to coordinate with structure and other trades to meet Architectural requirements

B. In order to obtain the Architects desired aesthetics in spaces used by building occupants, in all such spaces, prior to installation of visible materials, finishes and equipment (including access panels, review Architectural Drawings for desired locations and where not definitely indicated, request information from the Architect

C. Check Contract Drawings, as well as Shop Drawings, of all subcontractors to verify and coordinate spaces in which work of this section will be installed

D. Maintain maximum headroom at all locations. All piping, duct conduit, and associated components to be as tight to underside of structure as possible.

E. Make reasonable modifications in layout and components to prevent conflict with work of other trades and to coordinate according to Paragraphs A,B,C,D above. Systems shall be run in a rectilinear fashion.

F. Where conflicts or potential conflict exists and engineering guidance is desired, submit sketch of proposed resolution to the Architect for review and approval.

1.9 MEASUREMENTS

A. Contractor shall base all his measurements, both horizontal and vertical from established benchmark. All work shall agree with these established lines and levels. He shall verify all measurements at site; and check the correctness of same as related to the work.

1.10 MATERIALS AND WORKMANSHIP

A. Materials shall be new, meet detailed requirements of the Contract Documents and be identifiable as being specified or substitute products.

B. Materials which do not conform to the requirements of the Contract Documents, are not equal to approved samples or are unsatisfactory or unsuited to the purpose for which they are intended, will be rejected.

C. All work shall be performed in the best and most workmanlike manner by plumbers and mechanics skilled in their respective trades and properly licensed.

D. All equipment shall be installed in accordance with the recommendation of the manufacturer.

E. Defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or other cause shall be removed within ten (10) days after written notice is given by the Architect and the work shall be re-executed by the Trade

Contractor. The fact that the CO may have previously overlooked such defective work shall not constitute total or partial acceptance of it.

F. In no case shall a Bidder base his bid on a class of material or workmanship less than that required by the contract documents nor the governing codes and ordinances.

1.11 DEVIATIONS:

A. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice or other cause. Submit letter with transmittal of shop drawings, which flags deviation to the attention of the Architect.

B. Without letters flagging the deviation to the Architect, it is possible that the Architect may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Architect, the contractor shall hold the Architect and his consultants harmless for any adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Architect has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.

C. Approval of proposed deviations, if any, will be made at discretion of Architect.

D. Any of the approved deviations shall be deemed acceptable to this Contractor with no change in contract sum, unless the Architect along with the request for deviation receives a written notice to the contrary.

1.12 RESPONSIBILITY:

A. Intent of Submittal review is to check for capacity, rating, and certain construction features. Contractor shall ensure that the work meets the requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this or other Sections. Work shall comply with submittals marked "REVIEWED" to the extent they agree with the Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor shop drawing errors or deviations from requirements of Contract Documents. The Architect's noting of some errors while overlooking the others will not excuse the contractor from proceeding in error. Contract Documents are not limited, waived nor superseded in any way by review.

B. Inform subcontractors, manufacturers, suppliers, etc. Of scope and limited nature of review process and enforce compliance with contract documents.

1.13 SCHEDULE:

A. Incorporate shop drawing review period into construction schedule so that Work is not delayed. Contractor shall assume full responsibility for delays caused by not incorporating the following review time requirements into his project schedule. Working days listed reference the time in Engineer's office. It does not include transmittal time or review time of Contractor or Architect. Allow at least 10 working days, exclusive of transmittal time, for review each time shop drawing is submitted or resubmitted with the exception that 20 working days, exclusive of transmittal time, are required for the

following:

1 HVAC temperature control submittals.

2 HVAC balancing report.

3 Coordination Drawings.

4 If more than five shop drawings of a single trade are received in one calendar week.

1.14 LIST OF PROPOSED EQUIPMENT AND MATERIALS:

A. Within four weeks of Award of Contract and before ordering materials or equipment, submit complete list of materials and equipment and indicate manufacturer's name, addresses and telephone numbers. No consideration will be given to partial lists submitted out of sequence.

B. If the List of Materials and Equipment is not received within the prescribed time limit, provide the first-named manufacturer for all material and equipment on this project.

C. Specific requirements: No materials or products shall be provided which are not for permitted for use by local jurisdiction in the City of New York or items not permitted by the Commissioner.

1.15 DISTRIBUTION OF COORDINATION DRAWINGS:

A. The Sheet Metal Subcontractor shall provide the following distribution of documents:

1 One sepia of each Coordination Drawing to each specialty trade and affected Contractor for their use.

2 One Mylar of each Coordination drawing to Owner.

3 One sepia of each coordination drawing to the General Contractor/Construction Manager.

4 ALL FIREWALLS AND SMOKE PARTITIONS SHALL BE HIGHLIGHTED ON COORDINATION DRAWINGS FOR APPROPRIATE COORDINATION.

5 The main paths of egress and for equipment removal from main mechanical and electrical rooms must be clearly shown on coordination drawings.

6 Coordination Drawings shall include, but not limited to:

7 Plumbing systems, piping and equipment.

8 HVAC piping, systems and equipment.

9 Control systems.

10 Electrical distribution, systems and equipment.

11 Lighting systems and fixtures.

12 Sheet metal work, components and accessories, costs and boxes in terminals, etc.

13 Fire protection and sprinkler system, piping and heads.

14 Structural.

15 Electrical Equipment Room layouts.

16 Environmental Rooms and associated refrigeration/heating systems.

17 Partition/room layout.

18 Ceiling tile and grid.

19 Access panels.

20 Smoke and fire dampers.

21 Roof drain piping.

22 Major electrical conduit runs, panelboards, feeder conduit and racks of branch conduit.

23 Above ceiling miscellaneous metal.

24 Heat tracing of piping.

25 Minimum access space requirements for all equipment for both installation and maintenance.

1.16 REGULATIONS, CODES, PERMITS, AND FEES

A. Conform to all rules, regulations, standards, ordinances and laws of local, state, and Federal governments and other authorities that have legal jurisdiction over the site.

B. Prior to commencement of work, notify State and applicable authorities as required and submit all of the applicable notifications for construction, operation and demolition. Secure required permits and inspections from any of the authorities having jurisdiction, for this work and pay for all fees required for permits, inspections and review, including special agency construction.

C. Include all utility and local building department charges for providing temporary and permanent water, sewer, and gas services to buildings.

D. Provide Owner, Owner's Representative and Inspectors from any of the authorities / agencies having jurisdiction access to work at all times.

E. Trade Contractor shall be responsible for all law violations caused by the work under this Division. Notify Construction Manager in writing when a discrepancy occurs between code requirements and work shown on drawings and resolve matter before proceeding with work.

F. When requirements cited in this specification conflict with each other or with Contract Documents, most stringent shall govern work. Architect may relax this requirement when such relaxation does not violate ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing.

G. Make corrections in the work as required by the Owner's Representative or Inspector to pass local regulations.

H. Deliver to the Construction Manager any and all certificates of inspections, permits, and approvals. Submit final inspection certificates signed by governing authorities to the Owner.

I. Make all necessary submissions to the Department of Environmental Protection, Bureau of Air Resources and Management, Department of Labor and Industry and other agencies having jurisdiction. Pay all required fees for review, registration and sign off.

1.17 OPERATING AND MAINTENANCE MANUALS

A. General: Obtain at time of purchase of equipment, three copies of operation, lubrication and maintenance manuals for all items. Assemble literature in coordinated manuals with additional information describing combined operation of filed assembled units, including as-built wiring diagrams. Manual shall contain names and addresses of manufacturers and local representatives who stock or furnish or repair parts for items or equipment. Divide manuals into three sections or books as follows:

B. Directions for and sequence of operation for each item of the Mechanical and Electrical systems; e.g., air handling units, boilers, chillers, domestic water pump, generator, etc. Sequence list shall list valves, switches, and other devices used to start, stop and control system. Detail procedure to be followed in case of malfunctions. Include detailed approved flow diagrams of temperature control, heating, condensate, chilled water, condenser water, etc. as appropriate for systems provided. Include approved valve directory showing each valve number, location of each valve, and equipment or fixture controlled by valve. The section shall contain as a minimum, but not limited to the following items:

C. Startup & shutdown procedures: Provide a step-by-step write-up and video of all major equipment. When manufacturer's printed start-up, troubleshooting and shutdown procedures are available, they shall be incorporated into the operating manual for reference.

D. Operating Instructions: Written operating instructions and instructional video shall be included for the efficient and safe operation of all equipment.

E. Equipment List: List of all major equipment as installed shall include model number, capacities, nameplate data and manufacturers location and purchase order information.

F. Service Instructions: Provide the following information for all pieces of equipment:

1 Recommended spare parts, including catalog number and the name, address and telephone number of local suppliers of factory representative.

2 Lubrication and maintenance instructions for all equipment including all electric

motors.

3 Belt sizes, types and lengths.

a. Detailed list of all control set points and control and wiring diagrams and software.

b. Testing and Commissioning Sheets detailing all set points, balance figures for air and water systems and results of noise tests.

c. Include in the manuals, parts catalogs for each item of equipment furnished by him with the components identified by number of for replacement ordering.

d. Where applicable, provide type written instructions set in a glass frame.

e. All as-built drawings and wiring diagrams.

f. Valve charts organized on a room and sequence basis, detailing room, system and valve numbers.

g. Manual damper charts organized on a room and system basis, detailing room system and damper number.

h. Typewritten detailed description of sequence of operation of each system, with charts and diagrams.

i. Provide control diagrams, for each air and hydronic system. Diagrams shall show complete equipment, controls, model numbers, etc., marked to correspond to identification on equipment.

j. Letters from manufacturers certifying their supervision of equipment installation and startup procedures.

k. Machinery vibration test reports.

l. Certificates of sterilization/chlorination of plumbing systems.

m. Test certificates.

n. Instruction certificates.

o. Detailed maintenance and trouble shooting manuals furnished by manufacturer for complete maintenance. Include copy of performance, tests and balancing reports.

p. Lubrication instructions detailing type of lubricant, amount and intervals recommended by manufacturer for each item of equipment. Include additional instructions necessary for implementation of first class lubrication program. Include approved summary of lubrication instructions in chart form, where appropriate.

q. A lubrication chart listing each item of equipment, all points of lubrication, proper lubricant, dates lubricated, and lubrication schedule.

1.18 DIAGRAMS AND CHARTS

A. One copy of each valve chart, damper chart, and lubrication chart shall be mounted under glass and installed at locations to be selected by the Owner.

B. Provide control diagrams, for each air and hydronic system, suitably framed, with glass front. Diagrams shall show complete equipment, controls, model numbers, etc., marked to correspond to identification on equipment. Locate as directed by Owner.

C. Air and water flow diagrams.

D. Furnish three copies of manuals to Architect for approval and distribution to Owner. Deliver manuals no less than 30 days prior to acceptance of equipment to permit Owner's personnel to become familiar with equipment and operation prior to acceptance.

E. Provide framed and glazed charts as follows:

F. Flow diagrams from first part of manual as described above.

G. Valve directory.

H. Lubrication, valve and damper chart from third part of manual.

I. Operating Instructions: Upon completion of installation or when Owner accepts portions of building and equipment for operational use, instruct Owner's operating personnel in any or all parts of all systems. Instructions shall be performed by factory trained personnel. Owner shall determine which systems shall require additional instructions. Duration of instruction shall take equipment through complete cycle of operation (at least 7 days). Make adjustments under operating conditions.

J. Protection of work:

1 Each Contractor shall be responsible for his work and equipment until finally inspected, tested, and accepted. Carefully store materials and equipment which are not immediately installed after delivery to site. Close open ends of work with temporary covers or plug during construction to prevent entry of obstructing material.

2 Each separate contractor shall protect the work and material of other trades that might be damaged by his work or workmen and make good all damage thus caused.

1.19 FIELD ADJUSTMENT TO AIR HANDLING EQUIPMENT, PUMPS, AND FANS

A. Trade Contractor shall be responsible for changing or adjusting belts, drives, pulleys, motors, impellers, etc., as required, by adjustment for acoustic performance, and by balancing company to achieve the desired air and water delivery by all air handling equipment and pumps.

1.20 COOPERATION BETWEEN TRADES

A. Cooperate with all other Divisions performing work on this project as necessary to achieve a complete neatly fitted installation for each condition. Consult the Drawings

and Specifications to determine nature and extent of work specified in other Divisions that adjoins or attaches to the work of this Division. Confer with other Divisions at the site to coordinate this work with theirs in view of job conditions to the end that interferences may be eliminated and that maximum head room and clearance may be obtained. In the event that interferences develop, the Owner's Representative's decision will be final as to which Division shall relocate its work, and no additional compensation will be allowed for the moving of piping, ductwork, conduit, or equipment, to clear such interferences. Provide templates, information, and instructions to other divisions to properly locate holes and openings to be cut or provided.

B. For Testing and Balancing of the system, ensure full co-ordination between the Testing and Balancing subcontractor and all other Trades to achieve access to all system components, including leaving wall/ceiling sections down for access. HVAC Contractor shall be responsible for prebalancing checks and check sheet and responsibilities outlined in Section 23 0593.

C. Ensure full co-ordination between controls subcontractor and Testing and Balancing subcontractor to ensure the system is commissioned in accordance with the complete requirements of the complete contract documents.

1.21 HOIST, RIGGING, TRANSPORTATION AND SCAFFOLDING

A. Provide all scaffolding, staging, cribbing, tackle hoist and rigging necessary for placing all materials and equipment in their proper places in the Project. All temporary work shall be removed from the premises when its use is no longer required.

1.22 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment in its original package to prevent damage or entrance of foreign matter. Perform all handling and shipping in accordance with manufacturer's recommendations. Provide protective coverings during construction.

B. Identify materials and equipment delivered to Site to permit check against approved materials list, reviewed Shop Drawings.

C. Completely cover motors and other moving machinery to protect from dirt and water during construction.

D. Cap all openings in pipe and ductwork daily to protect against entry by foreign matter.

E. Protect premises and Work of other Divisions from damage arising out of installation of Work of this Division.

F. Perform Work in manner precluding unnecessary fire hazard.

G. All ductwork shall be delivered to site with all ends and openings capped with minimum of heavy gauge polyethylene sheeting taped all around to prevent ingress of moisture, dust, debris, etc.

H. Protect from loss or damage. Replace lost or damaged materials and equipment with new at no increase in Contract Sum. Protect from damage, water, dust, etc., material,

equipment and apparatus provided under this Division, both in storage and installed, until Notice of Completion has been filed. Provide temporary storage facilities for material and equipment. Material, equipment or apparatus damaged because of improper storage or protection will be rejected. Remove from Site and provide new, duplicate material, equipment or apparatus in replacement of that rejected.

I. All stock piled conduit and piping shall be placed on dunnage, and protected from weather and from entry of foreign material. All stored materials and equipment shall be carefully inspected prior to installation and replaced with new material or equipment if found to be damaged, corroded, etc.

1.23 GUARANTEE AND 24 HOUR SERVICE

A. Guarantee the Work of this section for one year following the date of Substantial Completion. If the equipment is used for ventilation, temporary heat, etc. prior to initial beneficial occupancy by the Owner, the bid price shall include an extended period of warranty covering the one year of occupancy starting from the initial date of beneficial occupancy by the Owner. The guarantee shall repair or replace defective materials, equipment, workmanship and installation that develop within this period, promptly and to Architect's satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within Contract Price.

B. In addition to guarantee requirements of Division 1 and of Paragraph A above, obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation, in Owner's name.

C. Replace material and equipment that require excessive service during guarantee period as defined and as directed by Architect.

D. Provide 24 hour service beginning on the date of substantial completeion and lasting until the termination of guarantee period. Service shall be at no cost to Owner. Service can be provided by this Contractor or a separate service organization. Choice of service organization shall be subject to Artchitect and Owner approval. Submit name and phone number that will be answered on a 24 hour basis each day of the week, for the duration of the service.

E. Submit copies of equipment and material warranties to Architect before final payment.

F. At end of guarantee period, transfer manufacturer's equipment and warranties still in force to Owner.

G. This paragraph shall not be interpreted to limit Owner's rights under applicable codes and laws under this Contract.

H. Part 2 Paragraphs of the Specification sections may specify warranty requirements that exceed those of this Paragraph.

I. Use of systems provided under this Section for temporary services and facilities shall not constitute Final Acceptance of work nor beneficial use by Owner, and shall not institute guarantee period.

J. Provide manufacturer's engineering and technical staff at site to analyze and rectify

problems that develop during guarantee period immediately. If problems cannot be rectified immediately to Owner's satisfaction, advise Architect in writing, describe efforts to rectify situation, and provide analysis of cause of problem. Architect will suggest course of action.

PART 2 PRODUCTS

2.1 GENERAL

A. Refer to each specific Mechanical and Electrical Section for details.

2.2 MATERIALS

A. Equipment and materials shall be as described in the respective Sections of Division 23 and Division 26 and as shown.

B. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.

C. Equipment, material damaged during transportation, installation, operation is considered as totally damaged. Replace with new. Variance from this permitted only with written acceptance.

D. All items of materials in each category of equipment shall be of one manufacturer.

2.3 MATERIAL AND EQUIPMENT–GENERAL REQUIREMENTS:

A. New.

B. Approved for use in the City of New York. Submit MEA number sand BSA numbers as appropriate.

C. Testing agency labeled or with other identification wherever standards have been established.

D. Owner's Representative reserves right to reject items not in accordance with Specification either before or after installation.

E. Comprised to render complete and operable systems; provide additional items needed to complete installation to realized design.

F. Compatible with space allocated. Modifications necessary to adjust items to space limitations at Contractor's expense.

G. Installed fully operating and without objectionable noise or vibration.

2.4 FLAME-SPREAD AND SMOKE-DEVELOPED PROPERTIES OF MATERIALS

A. All materials and adhesives used throughout the mechanical systems shall have a flame spread rating not over 25 without evidence of continued combustion and with a smoke-

service interruption.

M. Surveys and Measurements:

1 Base measurements, both horizontal and vertical, on reference points established by Contractor and be responsible for correct laying out of work.

2 In event of discrepancy between actual measurements and those indicated, notify Architect in writing and do not proceed with work until written instructions have been issued by Architect.

N. Fireproofing:

1 Clip, hangers, clamps, supports and other attachments to surfaces to be fireproofed shall be installed, insofar as possible prior to start of spray fiber work.

2 Ducts, piping and other items which would interfere with proper application of fireproofing shall installed after completion of spray fiber work.

3 Patching and repairing of fireproofing due to cutting or damaging to fireproofing during course of work specified under this section shall be shall be performed by installer of fireproofing and paid for by the trade responsible for damage and shall not constitute grounds for an extra to Owner.

O. Temporary Utilities:

1 Refer to Division 1 regarding requirements.

2 Coordinate work under this Section with progress of construction so that permanent heating system will be ready for temporary heating if permitted by Architect as soon as the building is closed in.

3 Provide and direct labor required for attendance, operation and final restoration of permanent heating system if used for temporary heating purposes. Continuous direct attendance shall be provided whenever permanent system is in operation prior to acceptance of permanent heating system by Owner.

a. Air bound Systems: If, after the plant is in operation, any piping systems, coils or other apparatus are stratified or air bound (by vacuum or pressure), they shall be repiped with new approved and necessary fittings, air vents, or vacuum breakers at no extra cost. If connections are concealed in furring, floors or ceilings, this trade shall bear the cost of tearing up and refinishing construction and finish, leaving same in as good condition as before it was disturbed.

b. Miscellaneous: Unload materials and equipment delivered to site. Pay cost for rigging, hoisting, lowering and moving electrical equipment on and around site, in building or on roof.

3.3 MATERIALS AND WORKMANSHIP

A. Work shall be neat and rectilinear. Ductwork, piping, conduit, etc. shall run concealed except in mechanical rooms and areas where no hung ceiling exists. Install material and

equipment as required by manufacturers. Installation shall operate safely and without leakage, undue wear, noise, vibration, corrosion or water hammer. Work shall be properly and effectively protected, and pipe and duct openings shall be temporarily closed to prevent obstruction and damage before completion.

B. Except as specified otherwise, material and equipment shall be new. Provide supplies, appliances and connections necessary for complete and operational installation. Provide components required or recommended by OSHA and applicable NFPA documents.

C. Finish of materials, components and equipment shall be as approved by Architect and shall be resistant to corrosion and weather as necessary.

D. Owner will not be responsible for material and equipment before testing, commissioning, and acceptance.

3.4 CONTINUITY OF SERVICES

A. Do not interrupt existing services without Owner's approval.

B. Schedule interruptions in advance, according to Owner's instructions. Submit, in writing, with request for interruption, methods proposed to minimize length of interruption.

C. Interruptions shall be scheduled at such times of day and work so that they have minimal impact to Owner's operations.

D. Subcontractor shall coordinate any shutdowns of existing systems as follows:

E. Give proper notice to Owner when making shutdowns; a minimum of fourteen full days are required.

F. Minimize shutdowns of any system.

G. Provide temporary services where required and perform shutdown and tie-ins at a time convenient to Owner.

H. Subcontractor shall be responsible for completing and filing Owner's shutdown notice questionnaire.

I. Perform required survey and inspection work required by the notice for shutdown.

J. Include premium time work associated with interruption of services and/or shutdown as necessary to avoid disruption to Owner's operations.

3.5 WELDING

A. Weld only by approved acetylene or electric welding process and welders shall hold certifucate from approved insurance company.

B. Conduct tests to demonstrate suitability of procedures to be used in making welds which conform to specified requirements.

C. Specification for welding procedure shall meet requirements of Welding Qualifications, Section IX, ASME Boiler and Pressure Vessel Code and ANSI B31.1.

D. Align components. No strain shall be placed on weld during welding. No part of pipe shall be offset more than 20% of thickness. Set flanges and branches properly.

E. Welder qualification:

1 Test welders to demonstrate ability to make acceptable welds. Tests conducted for qualification of welder for work under one Division or Section shall not qualify welder for work under another Division or Section.

2 Tests shall be as prescribed for welder qualification in Section IX of the ASME Code.

3 Records of such tests shall be as follows: Each welder shall be assigned an identifying number, letter or symbol. Identifying mark shall be stamped adjacent to welds made by this welder. Identification shall be at top of horizontal piping and at front of vertical piping.

4 Maintain record of welders employed, showing dates and results of tests and identifying mark assigned to each welder. Certify records and make them accessible to Owner's project representative and/or project manager. Before completion of project, one copy of records shall be turned over to Owner.

5 No qualification shall be older than three years when welder commences to work on this project. If the welder has not welded in required welding process for a period of six months, he shall be re-certified.

F. Welding Tests

1 As designated by Architect, remove welds for destructive testing or for testing by non-destructive means.

2 If, in Architects opinion, welds so tested do not meet requirements of Sections VIII and IX of ASME, then the contractor shall pay for costs of the tests. Remove welds welded by that welder at no cost to the Owner. Rewelding shall be performed by qualified welder other than welder whose weld did not pass the test. Welders whose welds were defective shall not be employed on site for remainder of the project.

3 Welding of stanchions, brackets, anchors and other welding not performed on pipe joints shall be in accordance with requirements of AWS specifications and requirements.

3.6 ACCESS AND ACCESS PANELS

A. Access panels shall be provided where indicated on drawings. Include allowance for 24x24 access panels in sheetrock ceilings for ceiling mounted equipment.

B. Provide proper access to materials and equipment that require inspection, replacement, repair or service, and coordinate their delivery with the installing Trade. If proper access cannot be provided, confer with Architect as to the best method of approach for minimizing effect of reduced access which may result.

C. Coordinate and prepare a location, size, and function schedule of access panels required to fully service equipment and deliver to a representative of installing Trade. Furnish and install distinctively colored buttons (color as selected by Architect) in finished ceiling to identify all access panels.

D. Furnish access panels for installation under other Sections where fire dampers, volume dampers, controls, shut-off valves, control valves, check valves, or other items installed under this section require access and are concealed in floor, wall, furred space or above ceiling. Access panels shall be by Milcor, Knapp, Nystorm or Inlanf Steel; coordinate selection with other Section supplying similar access panels

E. Ceilings consisting of lay-in or removable splined tiles do not require access panels and dampers, splitters, or test hole openings above ceiling shall have location marked with thumb tack on finished ceiling panel. Location shall be noted on record drawings.

F. Access panels shall have same fire rating classification as surface penetrated

G. Panels shall be atleast 12"x12"; access panels at equipment (VAV boxes, fan boxes and others) shall be 18"x18".

3.7 PENETRATIONS AND SLEEVES

A. General

1 Layout penetration and sleeve openings in advance, to permit provision in work. Set sleeves and conduit in forms before concrete is poured. Provide remedial work where sleeves and conduits are omitted or improperly placed.

2 Provide sleeves and packing materials at all penetrations of foundations, walls, slabs (except on grade), partitions and floors. Sleeves shall meet NFPA 101 requirements and material requirements of these specifications.

3 Sleeves that penetrate outside walls, basement slabs, footings and beams shall be waterproof.

4 Coordinate work carefully with architectural and structural. Set sleeves in forms before concrete is poured. Provide core drilling as necessary if walls are poured, or otherwise constructed, without sleeves and a wall penetration is required. Provide core drilling as required for penetration of existing construction. Do not penetrate structural members without Architect's approval.

5 Sleeves for insulated pipe and duct in no-fire rated construction shall accommodate continuous insulation without compression. Sleeves and/or penetration in fire rated construction shall be packed with fire rated material which shall maintain the fire rating of the wall. Seal ends of penetrations to provide continuous vapor barrier where insulation is interrupted.

6 Where pipes, etc. passing through openings are exposed in finished rooms, finishes of filling materials shall match and be flush with adjoining floor, ceiling, and wall finishes.

7 Identify unused sleeves and slots for future installation.

of Architect, relocate piping, ductwork and equipment to permit new work to be provided as required by Contract Documents. Remove non-functioning and abandoned piping, ductwork and equipment as directed by Architect. Dispose of or store items as requested by Architect.

I. Installation Only Items: Where this contractor is required to install items which it does not purchase, it shall coordinate delivery and be responsible for their unloading from delivery vehicles and for their safe handling and field storage up to time of installation. This trade shall be responsible for:

1 Any necessary field assembly and internal connections, as well as mounting in place of the items, including the purchase and installation of all dunnage supporting members and fastenings necessary to adapt to architectural and structural conditions.

2 Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.

J. This contractor shall carefully examine such items upon delivery. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of work of this contractor will be considered only if presented in writing within one week of their date of delivery. Unless such claims have been submitted this contractor shall be fully responsible for the complete reconditioning or replacement of the damaged items.

K. Maintenance of equipment and systems: Maintain equipment and systems until Final Acceptance. Ensure adequate protection of equipment and material during delivery, storage, installation and shutdown and during delays pending final test of systems and equipment because of seasonal conditions.

L. Use of premises: Use of premises shall be restricted as directed by Architect and as required below:

1 Remove and dispose of dirt and debris, and keep premises clean. During progress of work, remove equipment and unused material. Put building and premises in neat and clean condition, and do cleaning and washing required to provide acceptable appearance and operation of equipment, to satisfaction of Architect.

2 Store materials in a manner that will maintain an orderly clean appearance. If stored on-site in open or unprotected areas, all equipment and material shall be kept off the ground by means of pallets of racks and covered with tarpaulins.

3 Do not interfere with function of existing sewers and water and gas mains, electrical or mechanical systems and services. Extreme care shall be observed to prevent debris from entering pipe, ductwork and equipment. Confer with Architect as to disruption of services or other utilities due to testing, connection of new work to existing. Interruption of services shall be performed at time of day or night deemed by Owner to provide minimal interference with normal operation. Obtain Owner's approval of the method proposed for minimizing

developed rating not higher than 50. Materials include but not limited to are insulation, acoustical lining, filter, ducts, flexible connections, jackets or coverings regardless of kind, etc. If such materials are to be applied with adhesives and the adhesives used shall have a flame-spread rating not over 25 and a smoke developed rating not higher than 50.

B. "Flame Spread Rating" and "Smoke Developed Rating" shall be as determined by the "method of test of surface burning characteristics of building materials, NFPA no. 244, ASTM E84, Underwriters' Laboratories, Inc., Standard." Such materials are listed in the Underwriters' Laboratories, Inc., "Building Materials List" under the heading "Hazard Classification (Fire)."

PART 3- EXECUTION

3.1 COMMISSIONING OF EQUIPMENT AND SYSTEMS

A. General

1 Completion of start up and commissioning shall be accomplished as a prerequisite for substantial completion and shall be completed for each phase of construction. Refer to specification section 23 0800 "Integrated testing (Commissioning) of HVAC"

3.2 SPECIAL RESPONSIBILITIES

A. Cooperate and coordinate with work of other Sections in executing work of this Section.

B. Perform work such that progress of entire project including work of other Sections shall not be interfered with or delayed.

C. Provide information as requested on items furnished under this Section which shall be installed under other Sections.

D. Obtain detailed installation information from manufacturers of equipment provided under this section.

E. Obtain final roughing dimensions or other information needed for complete installation of items furnished under other Sections or by Owner.

F. Keep fully informed as to shape, size and position of openings required for material or equipment to be provided under this and other Sections. Give full information so that openings required by work of this Section may be coordinated with other work and other openings and may be provided for in advance. In case of failure to provide sufficient information on proper time, provide cutting and patching or have same done, at own expense and to full satisfaction of Architect.

G. Provide information as requested as to sizes, number and locations of housekeeping pads necessary for floor mounted vibrating and rotating equipment provided under this Section.

H. Notify Architect of location and extent of existing piping, conduit, ductwork and equipment that interferes with new construction. In coordination with and with approval

8 Fill slots, sleeves and other openings in floors and walls not used. Fill spaces in openings after installation of pipe, duct, conduit or cable.

9 Fill for floor penetration shall prevent passage of water, smoke, fire, and fumes. Fill shall be fire resistant in fire floors and walls, and shall prevent passage of air, smoke and fumes.

10 Sleeves through floors shall be watertight and shall extend 2" above floor surface.

B. Pipe and Conduit Sleeves:

1 Annular space between pipe/conduit and sleeve shall be at least ¼".

2 Sleeves are not required for slabs-on-grade unless specified otherwise.

3 Sleeves and packing materials, through rated firewalls and smoke partitions shall maintain fire rating of construction penetrated.

4 Do not support piping risers or conduit on sleeves.

C. Duct Sleeves and Prepared Openings:

1 Provide duct sleeves for round ducts 15" and smaller; provide prepared, framed openings for round ducts larger and for square, rectangular and flat oval ducts, except as otherwise specified otherwise. Sleeves shall meet SMACNA requirements.

2 Provide sleeves for ducts through 1-, 2- 0r 3- hour fire rated construction and smoke partitions, regardless of size or shape of ducts. Sleeves shall maintain fire rating of construction penetrated. Sleeve and seal materials, construction and clearances shall meet requirements of SMACNA Fire Damper and Heat Stop Guide for Air Handling Systems.

3 Prepared openings shall be framed to provide 1" clearance between framing and duct or duct insulation.

3.8 INSTALLATIONS, TESTING AND APPROVALS:

A. Installation shall meet manufacturer's recommendations exactly, particularly regards to safety, ventilation, removal of foreign materials and other details of installation. Dam openings as recommended. Remove flammable materials used for damming and forming seals in fire rated construction.

B. Sleeve penetration methods shall be water- and gas- tight and shall meet requirements of ASTM 119 Standard Methods of Fire Tests of Building Construction and Materials.

C. Fire-stop penetration seal methods and materials shall be FM-approved and UL-listed as applicable. They shall have same rating as the structure penetrated. Submit manufacturer's detail sheet indicating assembly rating.

D. Inspect foamed sealants to ensure manufacturer's optimum cell structure and color ranges.

3.9 ANCHORS AND INSERTS

A. Inserts shall be iron or steel of type to receive machine bolt head or nut after installation. Insert shall permit adjustment of bolt in one horizontal direction and shall develop strength of bolt when installed in properly cured concrete.

B. Provide anchors as necessary for attachment of equipment support and hangers.

3.10 ESCUTCHEONS

A. Install escutcheons around exposed pipe passing through finished floor, floor, wall, or ceiling. Escutcheons shall be heavy cast brass, chromium plated, adjustable, and of sufficient outside diameter to cover sleeve opening and shall fit snugly around pipe and flush against floor or wall surface. Escutcheon plates shall be provided on pipes at fixtures and shall be polished chrome plated. Plated steel escutcheon plates are not acceptable. Sample escutcheon plates shall be submitted to the Architect for approval prior to installation.

3.11 CORE DRILLING

A. Core drilling is to be avoided.

B. Set sleeves prior to installation of structure for passage of pipes, conduits, ducts, etc.

C. Where core drilling is unavoidable, or required by renovation projects, locate all required openings prior to coring and submit to Architect for review.

D. Coordinate openings with General Contractor/Construction Manager and all other trades.

E. Core drilling is to be provided by the Contractor for General Construction and not by the M/E subcontractors.

F. Do not disturb existing systems.

G. Thoroughly investigate existing conditions in vicinity of required opening prior to coring.

3.12 CARPENTRY, CUTTING AND PATCHING

A. In accordance with Division 1, Cutting and Patching Article, and as follows.

B. Provide all sleeves, core drilling, carpentry, cutting and patching required for proper installation of material and equipment shall be provided as per Construction Manager's bid package.

C. Do not cut or drill structural members without consent of Owner's Representative and Architect.

3.13 EXCAVATING & BACKFILLING

A. Preparation:

B. In accordance with the requirements of Division 2.

C. Provide barricades, signs, lanterns, shoring, sheeting and pumping as part of Work in this

Division as required to insure safe conditions.

D. Dig trenches straight, true to line and grade with sides and bottoms smoothed of any rock points. Excavate 6 inches below grade of pipe, fill with sand properly packed. Support pipe for entire length on packed sand. Shape or pack bottom of trenches for pipe, duct fittings, hubs, couplings, etc., using templates to fit outside periphery of lower third of piping and ductwork. Provide piping outside building with 36 inch minimum cover from top of pipe to finished grade. Minimum width 16 inches.

E. Dispose of all surplus excavation material and seepage water as directed.

F. Backfill shall be as per Division 1 requirements

G. After piping has been installed, tested and approved, backfill all excavation, tamp and compact by compressed air tampers.

H. Backfill to 6 inches above crown of pipe with unwashed sand, with remainder of trench back-filled and mechanically tamped in 6 inch maximum layers of selected excavated materials, free from organic matter, rocks, etc. Provide 90 percent compaction in accordance with ASTM D 1557-58T; 95 percent compaction for trenches below building slabs.

I. In any asphalt or concrete paved areas, backfill only to subgrade level.

J. When piping is installed, and prior to backfilling, advise CM. Do not backfill without acceptances of Owner's Representative.

K. Replace to original condition all paving, curbs, gutters, walks, etc., which become disturbed by trenching.

3.14 CUTTING AND REPAIRING

A. Assume responsibility for damage to any part of premises or Work of other Divisions, caused by leaks or breaks in piping or equipment furnished or installed under this Division during construction and guarantee/warranty period.

3.15 VIBRATION CONTROL

A. Coordinate with Division 1.

B. Design criteria for all the Work of Division 23 are specified in Section 23 0548.

C. Concrete Equipment Bases

D. Locate and size concrete base for all equipment located on existing floors. Base: 6 inches high and extending 6 inches beyond edge of equipment base unless indicated otherwise. Trade Contractor shall ensure equipment elevation is suitable for gravity drainage where relevant.

E. Coordinate concrete bases; concrete is specified in Division 3.

3.16 WATERPROOF CONSTRUCTION

A. Maintain waterproof integrity of penetrations of materials intended to be waterproof. Provide flashing at exterior wall and roof penetrations. Caulk watertight penetrations of foundation walls and floors. Provide membrane clamps at penetrations of waterproof membranes.

B. Provide galvanized sheet metal weather protection canopies, hoods or enclosures over all out-of-doors equipment, the operation or maintenance of which would be impaired by rainwater. This requirement applies to damper operators and bearing, damper motors, controls, and instruments. See other paragraphs in this Division for application of this requirement to motors, drive, ducts, and fans.

3.17 RESTORATION OF DAMAGE

A. Repair or replace, as directed by Architect, materials and parts of premises which become damaged as result of installation of Work of this Division. Remove replaced parts from premises.

3.18 LINTELS

A. Where openings break into an already completed wall as a result of a failure to set sleeves or provide openings during erection of the wall, the Trade Contractor shall provide lintels as required for the support of building construction above the inserted item.

B. Lintels shall be structural steel angles, channels or tees of proper size and sections for the supported load; submit to the Architect with supporting calculations for approval prior to the installation.

C. Where new openings are required in an existing wall co-ordinate opening size, location and lintel type with structural engineer.

3.19 ROOF OPENINGS AND CURBS

A. Roof openings where required shall be coordinated with Architect and all flashing and patching shall be as per details indicated on the Architectural plans.

3.20 TOOLS AND EQUIPMENT

A. Furnish all tools and equipment necessary for the proper installation, protection and upkeep of the Work.

3.21 ADJUSTMENT

A. Preliminary Operation:

B. Operate any portion of installation for Owner's convenience if so requested by Construction Manager. Such operation does not constitute acceptance of Work as complete. Cost of utilities, such as gas and electrical power, will be borne by Owner if Owner requests operation.

3.22 STARTUP SERVICE:

A. Prior to startup, ensure that systems are ready, including checking the following: proper equipment rotation, proper wiring, auxiliary connections, lubrications, venting fan

balance, controls and installed and properly set relief and safety valves.

B. Start and operate all systems. Provide services of factory trained technicians for startup of major equipment and systems including chillers, boilers, pumps, air handling units, etc.

3.23 ADJUSTING:

A. Adjust all equipment and system components as shown or as otherwise required to result in intended system operation.

B. Thereafter, as a result of system operation or as directed by Owner's Representative, make readjustments as necessary to refine performance and to effect complete system "tune-up".

C. After completion of testing and adjustment, operate the different systems and equipment under normal working conditions for 72 hours continuously and show specified performance. If, in the opinion of the Architect, performance of equipment or systems is not in accordance with specifications or submitted data, alter or replace equipment at no increase in Contract Sum. Trade Contractor, at his option, may order tests from an independent approved laboratory to prove compliance. All such tests shall be at no increase in Contract Sum. Repeat process as often as required. If the reason for unsatisfactory operation is design errors all additional cost for corrective measures will be reimbursed to the contractor.

D. At completion of Work, provide written certification that all systems are functioning properly without defects.

E. Noise:

1 Cooperate in reducing any objectionable noise or vibration caused by mechanical systems to the extent of adjustments to specified and installed equipment and appurtenances.

2 Cooperate in adjustment of mechanical systems and terminal devices, as directed by Owner's Representative, to obtain specified acoustic properties.

3 Completely correct noise problems caused by failure to make installation in accordance with Contract Documents, including labor and materials required as a result of such failure, at no increase in Contract Sum. Includes refinish walls, floors etc.

3.24 INSTALLATION OF EQUIPMENT

A. Use printed descriptions, specifications and recommendations of manufacturers as a guide for installation of Work.

B. Assemble equipment required to be field assembled under the direct supervision of the manufacturers' agent. Prior to the final acceptance submit letters from the manufacturers that this has been done.

C. Avoid interference with structure and with work of other trades, preserving adequate

headroom and clearing doors and passageways, to satisfaction of Architect and in accordance with code requirements. Installation shall permit clearance for access to equipment for repair, servicing and replacement.

D. Install equipment so as to properly distribute equipment loads on building structural members provided for equipment support under other Sections. Roof mounted equipment shall be installed and supported on structural steel provided under other Sections.

E. Provide suspended platforms, strap hangers, brackets, shelves, stands or legs as necessary for floor, wall of ceiling mounting of equipment as required.

F. Provide steel supports and hardware for proper installation of hangers, anchors, guides, etc.

G. Provide cuts, weights, and other pertinent data required for proper coordination of equipment support provisions and installations.

H. Structural steel and hardware shall conform to Standard specifications of ASTM; use of steel and hardware shall conform to requirements of Section V of Code of Practice of American Institute of Steel Construction.

I. Verify site conditions and dimensions of equipment to ensure access for proper installation of equipment without disassembly, which will void warrantee. Report in writing to Architect, prior to purchase or shipment of equipment involved, on conditions which may prevent proper installation.

3.25 ELECTRICAL REQUIREMENTS

A. Electrical Work in this Division shall conform to requirements of Division 26.

B. This Contractor shall furnish all motors, starters, variable frequency drives, disconnects for motors and heating coils and controls for equipment under his Contract, unless otherwise noted.

C. Division 26 Contractor shall install all starters, variable frequency drives, disconnects and overload protectors furnished by this Contractor and shall provide all necessary wire, conduit and boxes to properly connect equipment for this Contractor no matter how many disconnects, starters, etc are included, unless otherwise noted. Electrical Contractor shall receive, unload, set and install motor starters, disconnects and other items to be installed under Division 26.

D. This Contractor shall provide all necessary conduit and control wiring to pushbuttons, thermostats, pilot lights, interlocks and similar equipment for equipment under this Division.

E. Flow control switches, thermostats, controllers, relays, transformers, switches, etc and other components provided with equipment shown on the Contract Documents not to be factory wired or part of division 17 scope necessary for proper operation of mechanical systems shall be furnished and installed by this Contractor.

F. Where the starter and/or safety switch is an integral part of equipment assembly, the

assembly shall be furnished with the wiring complete between starter, controller and motor. The Electrical Contractor will make connections to unit terminals.

G. Factory wired assemblies and panels: Pre-wired to numbered terminal strips for connection to field wiring. Provide disconnect switch for each control circuit connection to pre-wired assemblies and control panels.

H. All motors and motor control equipment shall meet the requirements of NEC, and shall comply with requirements of the Public Utility Company furnishing service and with rules and regulations of all authorities having jurisdiction.

I. THIS CONTRACTOR SHALL VERIFY VOLTAGE AT SITE BEFORE ORDERING ANY ELECTRICAL EQUIPMENT.

3.26 WIRING:

A. Power wiring: Except for factory wiring on mechanical equipment, power wiring is specified in Division 26.

B. HVAC control wiring:

1 Except for factory wiring on mechanical equipment, specified in specification section "Automatic Temperature Controls".

2 All wiring and conduit shall be according to latest edition of the NEC. All control wiring shall be installed in EMT in accordance with applicable portions of NEC and requirements of Division 26.

3 Low voltage wiring in air plenums shall be UL approved conductor for application as manufactured by Alpha or Beldon.

3.27 FIRE PROTECTION SYSTEM WIRING: SEE DIVISION 26.

A. Provide electrical contractor approved wiring diagrams for work to be connected under Division 26.

B. Provide weatherproof devices and installation for out-of-doors work.

C. Smoke detectors: Product of combustion detectors in ductwork furnished under Division 26, installed by this Division 23, and wired by Division 26 to fire alarm system.

3.28 MOTORS:

A. Provide motors for equipment specified. Separately shipped motors are to be installed by Division 23. Coordinate with Division 26.

B. Separately shipped motors and variable frequency drives shall be received unloaded installed by Division 23, wired by Division 26. Adjustable motor bases and all bolts and nuts required for installation of base and motor shall be provided and installed by Division 23.

C. Align and adjust mechanical coupling for direct-driven motorized equipment. Adjust and align drive and belt tension on belt-driven equipment.

D. Field lubricate all motors prior to operation and maintain lubrication prior to acceptance of equipment by the Owner.

E. Provide to electrical contractor motor terminal connection diagram as prepared by motor manufacturers.

F. The Electrical Contractor shall be responsible for proper rotation of three phase equipment.

G. Power Factor Correction:

H. This Contractor shall be responsible for all equipment, labor, coordination and all other related appurtenances required for the installation of power correction devices at all equipment supplied under this contract. Equipment requiring power correction devices shall be furnished and installed with the same as hereinafter specified. Power factor correction devices (including means and methods) shall be included as part of their respective equipment submittal, materials, wiring diagrams, shop drawings, and catalog cuts for review by the Architect.

I. Devices shall be furnished and installed to ensure a minimum power factor of over 90% over the full operating range of the equipment. Equipment requiring power factor correction devices are:

1 Packaged Rooftop Units

2 Heat Pump Condensing Units

3 All three-phase mechanical exhausters and fans of any type.

3.29 PAINTING

A. Equipment installed shall have shop coat of non-lead gray paint. Hangers and supports shall have one coat of non-lead primer. Machinery such as pumps, fans, etc., shall be stenciled with equipment name. Stencil shall be at least 6" high for large equipment, 2" high for small equipment. Finish painting, including painting of various piping and duct systems, shall be done under other Sections.

B. Paint all outside exposed equipment and equipment supports with two coats of weather resistant enamel.

C. Provide heat resistant paint for hot piping, equipment and materials.

D. Note requirement for Architect's approval invoked under paragraph MATERIALS AND WORKMANSHIP regarding finish of material and equipment, which are visible or subject to corrosive or atmospheric conditions.

E. Properly prepare Work under this Division to be finish painted under Division 9.

3.30 LUBRICATION

A. Lubricate all equipment at completion of Work. Furnish Owner with a written lubrication schedule for all equipment as specified in Division 1 and Division 23.

3.31 EXPANSION PROVISIONS

A. Installation of piping must allow for expansion using offsets, loops, swing joints, expansion joints, etc. as necessary to prevent undue strain. Take-offs from mains to runouts shall not have less than three elbow swing.

B. Mains and risers with loops or offsets shall be securely anchored to structure so as to impart expansion towards loops or offsets. Anchors shall be constructed of heavy forged wrought iron, secured to pipe and to structure. Provide vibration isolation as required.

C. Provide pipe alignment guides as required to guide expanding pipe to move freely from anchor points toward expansion joints, offsets, etc.

3.32 CLEANING

A. Cleaning shall be performed prior to commissioning.

B. Completely cover all plumbing fixtures and all motors and other moving machinery to prevent entry of dirt and water during construction. Effectively cap all openings into ducts and pipes to keep foreign matter out during construction.

C. Protect all finished surfaces of fixtures with heavy paper pasted thereon, or by other means, throughout the period of construction.

D. Ductwork:

1 Ducts shall be thoroughly cleaned so that no dirt or dust shall be discharged from diffusers, registers or grilles, when system is operated.

2 Provide temporary connections for cleaning. Provide cheesecloth for openings during cleaning.

3 Replace filters prior to final inspection and testing.

4 Piping

a. Furnish pipe cleaning chemicals, chemical feed equipment, materials and labor necessary to clean pipe.

b. Permanently install necessary chemical injection fittings complete with stop valves.

c. After all piping systems have been pressure tested and approved for tightness, clean and flush piping as specified and as required by codes.

d. Maintain continuous blowdown and make-up, as required during flushing operation.

e. Equipment

f. After completion of project, clean exterior surface of all equipment, including concrete residue, dirt, paint residue, etc.

g. Plumbing fixtures - clean and polish fixtures immediately prior to final inspection.

3.33 FINAL INSPECTION

A. As the work nears completion, review the requirements of the Contract Documents, inspect the work and inform all parties involved in work to be corrected or completed before the project can be deemed substantially complete.

B. When the Project is substantially complete, notify Construction Manager and Architect in writing of this fact, listing those items of Work remaining incomplete, the reason therefore, and the anticipated date that all remaining work will be completed. Carry out own final inspection and satisfy the Work. The Construction Manager will then schedule final inspection of the Project.

C. The Commissioner reserves the right to cancel and reschedule the inspection in the event considerable more work remains to be completed or corrected than indicated in the written request for inspection.

D. All items not completed or found not complying with drawings or specifications by the Commissioner will be identified in their inspection report.

E. Correct all items on inspection report. Make the correction and initial and date each item on the report after corrections have been completed.

END OF SECTION

SECTION 230503

PIPE AND FITTINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This section specifies administrative and procedure requirements regarding mechanical work. Additional requirements are specified in various sections of Division 23 and also may be required during the execution of work due to project conditions.

C. Work Included: The work shall include, but not be limited to, the following:

1. Copper Tubing and Pipes.
2. Fittings and Accessories.

D. Related Work Specified Elsewhere

1. General Conditions Section 01 0000
2. Basic Mechanical Requirements - Section 23 0500

1.02 QUALITY ASSURANCE

A. Materials shall conform to the latest edition of reference specifications and industry standards specified herein and applicable, and to pertinent codes and requirements of local authorities having jurisdiction.

1. Certify brazing procedures, brazers, and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and jobsite brazing of piping work.

B. Manufacturer's Qualifications: Firms regularly engaged in manufacture of pipes and pipe fittings of types and sizes required, whose products have been in satisfactory use in similar service for not less than 3 years.

1.03 SUBMITTALS

A. Submit the following in accordance with submittal requirements as specified under General Conditions.

1. Product Data

a. Submit copies of manufacturer's latest published literature for each type of pipe and pipe fitting specified herein for approval. Obtain approval before ordering materials.

b. Data shall include piping schedule showing manufacturer, pipe or tube

weight, fitting type, and joint type for each piping system.

2. Certificates: Submit certificates attesting to compliance with these specifications to Commissioner for approval. Obtain approval prior to ordering materials.

   a. Brazing Certifications: Submit reports as required for piping work.

3. Maintenance Data: Submit maintenance data and parts lists for each type of mechanical fitting. Include this data, product data, and certifications in maintenance manual, as approved.

1.04 DELIVERY, STORAGE AND HANDLING

A. Provide factory-applied plastic end caps on each length of pipe and tube. Maintain end caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube.

B. Where possible, store pipe and tube inside; protect from weather. Where necessary to store outside, elevate above grade and enclose with durable, waterproof wrapping.

C. Protect flanges and fittings from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

PART 2 - PRODUCTS

2.01 MATERIALS/EQUIPMENT

A. Copper Tube and Pipe

1. Tubing - Copper Type CUL

   a. Copper: Hard temper.

   b. Standard: ASTM B88 for type K or ACR Type L, ANSI B31.5 Refrigeration Piping

2. Copper Pipe: Standard ASTM B42, seamless.

B. Copper Tube and Pipe

1. Tubing - Copper Type CUR

   a. Drawn-Temper Copper Tube: ASTM B 280, Type ACR, clean, dry and capped.

   b. Annealed-Temper Copper Tube: ASTM B 280, Type ACR, clean, dry and capped. Annealed copper tubing shall not be used for piping larger than 0.625 O.D.

c. Standard: ANSI B31.5 Refrigeration Piping

B. Copper Fittings

1. Wrought Copper Solder Joint Fittings: ANSI B16.22.

2. Copper Tube Unions: Provide standard products recommended by manufacturer for use in service indicated.

3. Solder / Brazing Alloy: Use Silfos-7 or Silvaloy 15 silver solder BCuP-5 (brazing) with 15 percent silver, 80 percent copper and 5 percent phosphorus.

4. Wrought Copper, Soldered / Brazed: Type CU-1

a. Solder or brazed joint ends.
b. Bronze Filler Metal: AWS A5.8, Classification BAg-7 (50 % silver), BCuP5 (15% Silver)
c. Standard: ANSI B16.22

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions at the job site where work of this section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.02 PREPARATION

A. Examine the Contract Drawings and specifications in order to insure the completeness of the work required under this Section.

B. Verify measurements and dimensions at the job site and cooperate in the coordination and scheduling of the work of this Section with the work of related trades, so as not to delay job progress.

3.03 INSTALLATION

A. Pipe and Fittings

1. Coordinate layout and installation of refrigerant piping and suspension system components with other construction, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

2. Coordinate pipe sleeve installations for foundation wall penetrations.

3. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

4. Coordinate pipe sleeve installations for penetrations in exterior walls and floor assemblies. Coordinate with requirements for firestopping specified in Section 07270, "Firestop and Smokestop Systems" for materials and methods for sealing pipe penetrations through fire and smoke barriers.

5. Coordinate pipe fitting pressure classes with products specified in related Sections.

6. Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical or electronic equipment spaces and enclosures unless unavoidable. Install drip pan under piping that must be run through electrical spaces.

B. Pipe and Fittings

1. Basic piping installation requirements are specified in Section 23 0500, "Basic Mechanical Materials and Methods."

2. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings. Piping shall be installed parallel with the building lines unless otherwise noted, with appropriate pitch free from traps.

3. Pipe shall be cut accurately to measurements established at the construction site and shall be worked into place without springing or forcing. Pipes shall be installed as to permit free expansion and contraction without damage to joints or hangers.

4. When pre-charged, coiled tubing is furnished with split system, the excess tubing shall be coiled and placed out of view.

5. Pipe shall be provided with capped or plugged ends when shipped and as erected, to prevent contaminating the system.

6. Oil Return: Manufacturers specifications shall be followed for oil return on risers of 20 ft. or more (i.e., oil separators, p-traps or inverted p-traps).

7. Pipe Joints - Brazed - Silver Solder

   a. Make brazed joints by heating the pipe and fitting with an oxyacetylene torch to proper temperature for the silver solder to flow. Brazing shall be as per ASME B31.

   b. Support joints during the heating process and avoid strain on the joints during the cooling period.

   c. Remove burrs and clean tubing ends with emery cloth for a distance equal to the length of the fitting recess. Steel wool Is not permitted.

d. Apply flux to tubing and fitting recess before joining.

e. Brazing alloy shall not contain cadmium.

f. During brazing an inert gas (such as dry nitrogen, argon) shall be continuously passed through the system at a flow rate sufficient to maintain an oxygen-free envi-ronment to prevent the formation of copper oxide scale.

g. Care shall be taken to prevent annealing of fittings and tubing when making connections.

h. Copper to copper joints shall be brazed with a copper-phosphorous brazing alloy containing a minimum of 15% silver and conforming to AWS A5.8, BCuP5.

i. Copper to brass joints shall be brazed with a silver brazing alloy containing a minimum of 50% silver and conforms to AWS 5.8, BAg-7.

j. Copper to stainless steel joints shall be brazed with a silver brazing alloy containing a minimum of 50% silver and conforms to AWS 5.8, BAg-7.

k. All brazed joints shall be cleaned to remove residual flux.
Where patented fittings are used, the manufacturer shall instruct workmen as to the installation of the brazed joint fitting prior to the start of work.

l. Size of torch tip, heating time and gas required shall be in accordance with the requirements of the manufacturer of the fittings and the brazing materials.

8. Sway Bracing of Pipes Inside Building: Provide approved anchors or thrust blocks in sprinkler and fire lines subject to water pressures greater than for which designed when connected to fire department pumps. Obtain data from local fire department to determine need for and design criteria for such special support. If required, meet applicable requirements of NFPA, 1985, p.13-68, Section A-3-10.3.5.

9. Arrangement and Alignment

a. Install piping in straight parallel lines.

b. Install pipe groups for plumbing and HVAC parallel with pipe and conduit of other trades.

c. Pipe and fittings furnished as part of factory fabricated equipment are specified as part of equipment assembly in other sections.

3.04 FIELD QUALITY CONTROL

A. Material Tests and Identification

1. In addition to the tests required for specific systems, the manufacturer shall test or guarantee material specified prior to delivery.

2. Inspect materials for defects. Identify materials with factory applied permanent stampings or markings designating their conformance with specified requirements.

C. Testing of Piping - General

1. Pressure test refrigerant piping and joints for leaks, before any piping is enclosed, insulated, or concealed in any way. Follow specific procedures, if given, in the other specification sections.

2. Test pressure piping in accordance with ASME B31.

4. Provide temporary equipment for testing, including pump or compressor and gauges. Test piping system before insulation is installed, wherever feasible, and remove control devices before testing. Test each natural section of each piping system independently, but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for indicated pressure and time.

a. Required minimum test period is 4 hours.

b. Test runs at pressures listed except where fittings are lower Class or pressure rating.

c. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5 percent of test pressure.

5. Repair piping system sections which fail required piping test by disassembly and reinstallation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

3.05 LEAK TESTING OF REFRIGERATION PIPING SYSTEMS

A. The highside and lowside of each completed refrigeration piping system shall be pressure tested at a pressure not less than the lower of the system design pressure or the setting of the pressure relief device protecting the highside or lowside of the system.

Exception: Field installed systems with copper tubing not exceeding 0.625" O.D., shall be tested by means of refrigerant charged into the system at the saturated vapor pressure of the refrigerant at 68oF minimum.

The testing media shall be dry nitrogen. The contractor shall perform the leak test before insulating, evacuating and charging, in the presence of the Owner delegated Representative.

Isolate the compressor from the leak test by firmly closing the suction and discharge valves.

Where pressure relief valves are installed, position the three-way dual shut-off valves so that full test pressure is applied to both relief valves.

Do not attempt to repair any leak while the system is pressurized. If any leaks are found, relieve the test pressure and perform repairs.

Recharge the system, as previously described, and allow it to remain under pressure for 24 hours. Maximum pressure drop shall be 5 psig in 24 hours, at constant ambient temperature. For every 10oF drop in ambient temperature, from start of test, the maximum pressure drop may increase by 3 psig.

3.06 EVACUATION AND CHARGING

A. After completion of the piping pressure test, the refrigeration system shall be evacuated and dehydrated with a vacuum pump. The following procedure shall be used unless otherwise noted:

Connect to the system, an accurate high vacuum gauge with a range of 0 - 1000 microns Hg.

Connect the vacuum pump to both the high and low side of the system. Leave the compressor suction and discharge service valves closed. Start the vacuum pump.

Keep ambient air temperatures above 60oF during the evacuation process.
Operate the vacuum pump until the system is evacuated to 500 microns Hg.

Break the system vacuum with dry nitrogen. Open the compressor suction and discharge service valves and re-evacuate the system to 500 microns Hg.

After the system has been twice evacuated to 500 microns Hg, close the vacuum pump suction valve and stop the pump. Allow the system to stand under a vacuum a minimum of 12 hours. If no rise in pressure has taken place after 12 hours, the system may be charged. This test shall be made in the presence of the Owner delegated representative.

The Contractor shall furnish and install full charge of refrigerant required to develop the system to its full rating. Also, during the warranty period, the contractor shall

replace, without cost, all refrigerant lost due to equipment failure or system leaks. Refrigerant type and charge shall be as listed on equipment nameplate.

The Contractor shall provide the initial charge of lubricating oil for all refrigeration equipment and related apparatus.

After the refrigeration system has been charged and has been in continuous operation for one week, the contractor shall replace the initial type "HH" filter drier with the final filter dryer.

3.07 SCHEDULE

A. Equipment Drains

1. Pipe: Type CUL, Copper
2. Fittings: Type CU-1or CU-2 , minimum 150 psi
3. Joints: 95-5 Solder
4. Hangers and Supports: Type MSS-1
5. Provide plugged tees for cleanout in every change in direction.

B. Refrigeration

1. Pipe: Type CUR. Drawn temper copper tube, ASTM 280, Type ACR, clean dry and capped. Annealed copper tubing shall not be used for piping larger than 0.625 O.D.
2. Fittings: Type CU-1, brazed, minimum 300 psi
3. Bronze Filler Metal: AWS A5.8, classification Bag-7 (50% Silver), BCuP5 (15% Silver)
4. Service Test Pressure: As required
5. Hangers and Supports: Type MSS-1 and MSS-8
6. Joints
   a. Refrigerant R-410: Brazed joints, Silver Solder or as specified by manufacturer

END OF SECTION

SECTION 230513
MOTORS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide labor, materials, equipment and services, and perform operations required for complete installation of Motors and related work as indicated on the drawings and specified herein.

B. Work Included: The work shall include, but not be limited to, the following:

1. Furnishing and setting of motors factory-installed as part of mechanical equipment.
2. Furnishing and setting of field installed motors.

C. Related Work Specified Elsewhere: Refrigerant-cooled motors are specified as part of the refrigeration equipment in other Division 23 sections.

D. Applicable Requirements: Requirements of the following sections apply to the work of this section:

1. General Requirements - Division 1.
2. Basic Mechanical Requirements

1.02 QUALITY ASSURANCE

A. Motors shall conform to the latest edition of the codes and standards listed herein and to applicable codes and requirements of local authorities having jurisdiction.

1. NFPA 70 - National Electrical Code.
2. NEMA Standard MG 1 - Motors and Generators.

B. NRTL Listing: Provide motors listed by a Nationally Recognized Testing Laboratory. The term "listed" shall be as defined in the National Electrical Code, Article 100.

1.03 SUBMITTALS

A. Submit the following in accordance with the requirements specified in Section 23 0500.

1. Driven Equipment Shop Drawings: Indicate motor characteristics and performance data. Identify motors by manufacturer and model number.
2. Product Data: Submit copies of motor manufacturer's latest published literature for each type of motor.

1.04 DELIVERY, STORAGE AND HANDLING

A. For factory installed motors refer to the delivery, storage and handling requirements for the driven equipment.

B. Deliver motors for field installation in manufacturer's containers or cratings. Store indoors and protect from damage.

PART 2 - PRODUCTS

2.01 MATERIALS/EQUIPMENT

A. Electric Motors

1. Motor Type: Except where specifically otherwise indicated, provide motor types as follows:

   a. Motors 1/2 HP and Larger: Polyphase, squirrel-cage induction type.

   b. Motors 1/3 HP and Smaller: Single-phase, one of the following types:

      1) Permanent split capacitor.

      2) Split-phase start, capacitor-run.

      3) Capacitor-start, capacitor-run.

      4) Shaded-pole - only for motors smaller than 1/20 hp.

2. Insulation: Provide NEMA Class B insulation, based on 40 degrees C ambient temperature, except as otherwise indicated.

3. Service Factor: Motors shall have a service factor of 1.15. However, motor sizes shall be large enough so that the driven load will not require the motor to operate in the service factor range.

4. Torque: Torque characteristics shall be sufficient to satisfactorily accelerate the driven loads. Provide NEMA design "B" motors, except "C" where required for high starting torque.

5. Capacity: Provide motors rated for continuous duty at 100 percent of rated capacity. Provide each motor capable of making starts as frequently as indicated by the automatic control sequence of operations, but not less than 5 evenly spaced starts per hour.

6. Phases and Current Characteristics: Coordinate current characteristics with power specified in Division 26 sections, and with individual equipment requirements specified in other Division 23 sections. Do not purchase motors before confirming power characteristics available at locations of motors.

7. Motor Horsepower: When equipment brake horsepower submitted on shop drawings is greater than indicated on the schedules, use the following table to reselect the motor size and related accessories. This change and required modifications to the electrical work shall be at no additional cost to the Owner.

Motor Horsepower (MHP)	Brake Horsepower
Up to 1-1/2	80 percent max. of MHP
2 to 10	85 percent max. of MHP

8. Motor Construction

   a. Frames: NEMA Standard No. 48 or 54, except where NEMA No. 56 is specified for heavier duty applications. Use driven equipment manufacturer's standards to suit specific application.

   b. Bearings: Ball or roller bearings with inner and outer shaft seals,

regreasable except permanently seal where motor is normally inaccessible for regular maintenance. Where belt drives and other drives produce lateral or axial thrust in motor, design bearings to resist thrust loading. Refer to individual sections of Division 23 for fractional-hp light-duty motors where sleeve-type bearings are permitted.

c. Enclosure Type: Except as otherwise indicated, provide open drip-proof motors for indoor use. Refer to schedules and individual sections of Division 23 for other enclosure requirements.

NEMA Enclosure	Abbreviation
Open Drip-proof	ODP
Open Drip-proof, Air Over	ODAO
Totally Enclosed, Air Over	TEAO

9. Internal Thermal Overload Protection: For motors so indicated, protection automatically opens the power supply circuit to the motor, or a control circuit arranged for external connection. Protection operates when winding temperature exceeds a safe value calibrated to the temperature rating of the motor insulation. Provide device that requires manual reset except where otherwise indicated.

10. Grounding : Provide an integral grounding lug or terminal in motor junction box.

11. Nameplate: Provide metal nameplate on each motor, indicating full identification of manufacturer, ratings, characteristics, construction, special features and similar information. Relocate as approved to assure easy readability when motor is in its installed location.

12. Motor Efficiency: Provide high efficiency polyphase motors having NEMA nominal efficiencies equal to or greater than the following:

    a. Efficiency: Efficiencies listed in Table 12-6B of NEMA MG-1 for each type and rating of motor.

13. Multi-Speed Motors: Provide separate winding for each speed on polyphase motors.

14. Variable Speed Motors

    a. Polyphase motors driven by variable frequency drives shall have the rating, characteristics and features coordinated with and approved by the drive manufacturer. Use cast iron construction motors with heavy casing end bells.

    b. Single phase motors controlled by solid state speed controllers shall be matched and supplied as a package by the driven equipment manufacturer.

15. Noise Rating: Provide 3600 rpm motors of quiet construction and bearing "Quiet" rating.

16. Manufacturer: Except where an item of mechanical equipment, which otherwise complies with requirements, must be integrally equipped with a motor produced by another manufacturer, provide motors for mechanical equipment manufactured by one of the following:

    a. Allis-Chalmers Corp.

b. Baldor Electric Co.
c. Century Electric Div., Inc.
d. General Electric Co.
e. Marathon Electric Mfg. Corp.
f. Reliance Electric Co.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions at the job site where work of this Section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.02 PREPARATION

A. Examine the Contract Drawings and specifications in order to insure the completeness of the work required under this Section.

B. Verify measurements and dimensions at the job site and assist in the coordination and scheduling of the work of this Section with the work of related trades, so as not to delay job progress.

3.03 INSTALLATION

A. Install motors in accordance with motor manufacturer's instructions.

B. Mounting Systems

1. Direct Connected Motors: Secure to non-adjustable base in permanent alignment with equipment.

2. Belt Driven Motors: Secure motor to adjustable sliding base and align pulleys. Fixed base with slotted mounting holes can be used for fractional horsepower motors.

END OF SECTION

SECTION 230514
MOTOR STARTERS AND CONTROL WIRING

PART 1 – GENERAL

1.01 SUMMARY

A. Provide labor, materials, equipment and services, and perform operations required for complete installation of Motors and related work as indicated on the drawings and specified herein.

B. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

C. All field applied adhesives, sealants (used as fillers), prime painting, and finished painting shall comply with the low VOC requirements called out in Division 1.

D. Related Work Specified Elsewhere

1. General Conditions Section 01 0000
2. Addendum to General Conditions
3. Section 23 0500 – Basic Mechanical Materials and Methods
4. Electrical work in this Division shall conform to requirements of Division 26

1.02 SCOPE

A. Furnish starters for all mechanical equipment,. Provide control and other related wiring including interlocks. Power wiring (to panelboards, disconnect switches, starters and motors) will be provided under Division 26. Starters that are not integral to the equipment will be installed and wired under Division 26, and furnished under this Section.

B. Where the starter and/or safety switch is an integral part of equipment assembly, the assembly shall be furnished with the wiring complete between starter, controller and motor. The Electrical Contractor will make connections to unit terminals.

C. Division 26 Contractor shall install all starters, variable frequency drives, disconnects and overload protectors furnished by this Contractor and shall provide all necessary wire, conduit and boxes to properly connect equipment for this Contractor no matter how many disconnects, starters, etc are included. Electrical Contractor shall receive, unload, set and install motor starters, disconnects and other items to be installed under Division 26.

D. This Contractor shall provide all necessary conduit and control wiring to pushbuttons, thermostats, pilot lights, interlocks and similar equipment for equipment under this Division.

E. Factory wired assemblies and panels: Pre-wired to numbered terminal strips for connection to field wiring. Provide disconnect switch for each control circuit connection to pre-wired assemblies and control panels.

F. All motors and motor control equipment shall meet the requirements of NEC, and shall comply with requirements of the Public Utility Company furnishing service and with rules and regulations of all authorities having jurisdiction.

G. THIS CONTRACTOR SHALL VERIFY VOLTAGE AT SITE BEFORE ORDERING ANY ELECTRICAL EQUIPMENT.

H. Wiring:

1. Power wiring: Except for factory wiring on mechanical equipment, power wiring is specified in Division 26.

2. HVAC control wiring:

a. Except for factory wiring on mechanical equipment

b. All wiring and conduit shall be according to latest edition of thc NEC. All control wiring shall be installed in EMT in accordance with applicable portions of NEC and requirements of Division 26.

c. Low voltage wiring in air plenums shall be UL approved conductor for application as manufactured by Alpha or Beldon.

3. Fire protection system wiring: See Division 26.

4. Provide electrical contractor approved wiring diagrams for work to be connected under Division 26.

I. Provide weatherproof devices and installation for out-of-doors work.

J. Duct Smoke Detectors: Product of combustion detectors in ductwork furnished and installed under Division 23, installed by this Division 23, and wired by Division 26 to BMS and /or Fire Alarm System.

1.03 QUALITY ASSURANCE

A. Approvals:

1. NEMA

2. IEEE

3. ANSI

B. Testing:

1. Procedure: ANSI C50.20

2. Forward certified test reports for approval to Commissioner within 30 days after delivery of motors to job site.

3. Test all motors to insure freedom from mechanical and electrical defects.

1.04 REFERENCE STANDARDS

A. See Division 26 Specifications for additional requirements for Motors and Starters to be provided under Division 23.

1.05 SHOP DRAWING SUBMITTALS FOR STARTERS AND DISCONNECT:

A. Certified Shop Drawing submittal for each starter and disconnect.

1. NEMA Design Letter

PART 2 – PRODUCTS

2.01 MANUFACTURERS

1. Cutler Hammer
2. Siemens
3. Square D
4. Approved Equal

2.02 CONTROL WIRING

A. All wiring and conduit shall be according to the latest edition of the NEC. All control wiring shall be installed in EMT, and in accordance with applicable portions of NEC and of Division 26.

B. Low voltage control wiring in air plenums shall be UL approved conductor for application as manufactured by Alpha or Beldon.

2.03 MOTOR STARTERS AND CONTROLS

A. All motor controllers and starters integral with the equipment or furnished as a part of the equipment control panel shall be in accordance with the following:

1. Each controller, mounted in NEMA type enclosure shall be suitable for the particular service and/or location, listed below as approved:

a) Heated Area: NEMA Type 1
b) Unheated Area: NEMA Type 12
c) Outdoor Area: NEMA Type 3R

2. Provide HOA switch in starter covers for all motors automatically controlled. Pushbuttons are not required where HOA switches are used.

3. Provide control circuit fusing in all controllers.

4. Provide all necessary auxiliary contacts and transformers in starters as required. Provide time delay relays for all interlocked motors. In addition to the above, provide two (2) form 'a' and two form 'b' auxiliary isolated contacts wired to terminal strip for use by other trades.

5. All pilot lights shall be incandescent push to test transformer type with red or green jewel as approved. Provide pilot lights where required as follows:

d) All Starters with start/stop push button: 1 pilot light to indicate "Motor On".

e) Starters with HOA switches: 1 pilot light to indicate "Motor On".

6. All motor controllers and starters individually mounted shall be of the following type:

f) Combination unfused disconnect switch and magnetic controller with overload protection and low voltage protection.

g) Manual toggle switch single pole starter with overload protection in approved NEMA enclosure with pilot light.

7. Provide all starters with reset buttons in cover and overload protection. For 3 phase starters, all three phases shall have overload protection.

8. Enclosure sizes and wiring terminals shall be suitable for the number of motor and control circuits and disconnects required.

9. All starters shall automatically restart if there is a power outage, unless otherwise noted.

10. Starters shall be subject to the approval, as to the limit of inrush current, as set up by the Utility Company. Where reduced voltage starters are to be provided, the Mechanical Contractor is responsible for providing this information to the Electrical Contractor for him to include cost of connecting these starters in his bid. In general, magnetic starters shall be located close to the equipment controlled.

11. Motor starters for motors 1/2 HP thru 30 HP and all automatically controlled motors shall be magnetic across the line type.

12. Motor starters for motors smaller than 1/2 HP and not automatically controlled shall be manual thermal overload switch type.

2.04 LOOSE STARTERS SHALL BE AS FOLLOWS:

A. Manufacturer: Except where an item of mechanical equipment must be integrally furnished with a motor starter produced by another manufacturer, starters for all mechanical equipment shall be by a single manufacturer:

1. Allen-Bradley.
2. Cutler-Hammer, Inc.
3. General Electric Co.
4. Square D Co.
5. Westinghouse Electric Co.

3.02 ELECTRICAL WIRING

A. Provide all necessary wiring diagrams indicating wire size and connections as required for the proper operation of the equipment.

B. Contractor shall be responsible for replacing all fuses during construction which blow due to tests or malfunction of his motorized or other electrical equipment.

C. Perform all local control, interlock, and alarm wiring under this section.

D. Provide terminals for power feeder and for remote stop buttons to be provided under other sections.

E. Provide terminal strip with terminals wired to auxiliary contacts specified above.

END OF SECTION

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6. Approved Equal

B. General:

1. Starters that require interlocks or remote control shall be magnetic HAND-OFF-AUTOMATIC switch (fast-slow-off-auto for two speed motors) in cover. Provide magnetic starters as necessary, with auxiliary contacts, buttons and switches in required configurations.

2. Where motors are specified as multi-speed, provide multi-speed starter with speed and direction selector control switch.

3. Where motors are specified to be reversible, provide reversing start and direction selector switch.

4. In addition to auxiliary contacts required for interlocking or indicating purposes, provide magnetic starters with one normally closed and one normally open additional contact(s) for future use.

5. Enclosure:

a. Suitably hinged and interlocked with the handle of the disconnect means to prevent opening when the handle is in closed position.

b. NEMA type enclosure shall be suitable for the particular service and/or location, listed below as approved:

(1) Heated Area: NEMA Type 1

(2) Unheated Area: NEMA Type 12

(3) Outdoor Area: NEMA Type 3R with flush mounted enclosure and plate.

c. Size suitable for the application of copper power and control circuit wires.

d. Equipped with approved padlock and key and a means for padlocking its manual line disconnect in the open position.

6. Control relay for each starter shall be 120 V, single phase, and transformer of sufficient capacity within starter case with ON-OFF switch.

7. Provide inverse time limit overload and under voltage protection in each leg and with pilot lights. Provide red and green On-Off pilot lights.

8. Wire all starter control wires for external connection including spare auxiliary contacts to terminal blocks. Each terminal block point shall be identified with unique number shown also on submitted wiring diagrams.

9. Provide nameplates with engraved high white lettering on a black background to identifying motor and equipment/system controlled.

10. Starters for refrigeration machines shall be furnished by unit manufacturer.

11. Provide starters for two speed motors with deceleration relay.

12. Furnish for all single speed motors above 25HP and above, 95% power correction factor capacitors. Capacitors shall be in NEMA enclosure of same rating as the motor's starter.

C. Fractional Horsepower Starters for Motors less than ½ HP:

1. Thermal overload relay with field adjustment capability.

2. Quick-make, quick-break mechanism.

3. Pilot light indicating activation.

4. Speed control, where indicated.

D. Starter for Motors ½ HP and up to 30 HP:

1. Combination magnetic starter with unfused, disconnect switch, unless indicated to be fused, or of the circuit breaker type.

2. Provide an individually fused transformer to permit external control circuit operation at a nominal voltage of 120 volts. Ground unfused secondary wire.

3. Provide NEMA I Class A enclosure with running overload relay and disconnect for each pole.

4. Size fusible switch gaps for time delay type fusing. For combination circuit breaker, provide ambient compensation features extending to 50°C.

5. Magnetic Starters NEMA Size 3 and Larger: Equipped with an auxiliary control circuit relay arranged to permit the actuating of the starter without introducing holding coil currents into the external control circuit.

6. Magnetic Starters NEMA Size 5 and Larger, Intended to Operate at a Power Circuit Voltage in Excess of 250 Volts Line-to-Line: Equipped with an integral phase failure protection relay system.

7. Equip starter with a low voltage, manual reset "lockout" relay arranged to open the main holding coil circuit following a loss of line voltage, and then to maintain it open (pending manual reset) regardless of maintained contact features (if any) in the external control circuit.

PART 3 – EXECUTION

3.01 GENERAL

A. Motors and starters installed, not in compliance with the above and General Conditions requirements Section 01000, shall be replaced at no cost to the City of New York.

SECTION 230529
SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.01 SUMMARY

A. This section specifies administrative and procedure requirements regarding mechanical work. Additional requirements are specified in various sections of Division 23 and also may be required during the execution of work due to project conditions.

B. Work Included: The work shall include, but not be limited to, the following:

1. Extent of supports and anchors required by this section is indicated on drawings and/or specified in other Division 23 sections.

2. Types of supports and anchors specified in this section include:

a. Horizontal Piping Hangers and Supports.

b. Vertical Piping Clamps.

c. Hanger Rod Attachments.

d. Building Attachments.

e. Saddles and Shields.

f. Spring Hangers and Supports.

g. Miscellaneous Materials.

h. Roof Equipment Supports.

i. Anchors.

j. Equipment and Piping Supports.

3. Supports and anchors furnished as part of factory-fabricated equipment, are specified as part of equipment assembly in other Division 23 sections.

C. Related Work Specified Elsewhere

1. Basic Mechanical Requirements

1.02 QUALITY ASSURANCE

A. Materials and work shall conform to the latest edition of reference specifications and industry standards listed below and specified herein and to applicable codes and requirements of local authorities having jurisdiction, whichever is more stringent.

1. Code Compliance: Comply with applicable plumbing codes pertaining to product materials and installation of supports and anchors.

2. UL and FM Compliance: Provide products which are UL listed and FM approved.

3. MSS Standard Compliance

a. Provide pipe hangers and supports of which materials, design, and

manufacture comply with MSS SP-58.

b. Select and apply pipe hangers and supports complying with MSS SP-69.

c. Fabricate and install pipe hangers and supports complying with MSS SP-89.

d. Terminology used in this section is defined in MSS SP-90.

1.03 SUBMITTALS

A. Submit the following in accordance with the requirements specified under Submittals in Section 23 0500.

1. Shop Drawings: Submit shop drawings for work specified herein for approval. Shop drawings shall show manufacturer's assembly-type shop drawings for each type of support and anchor, indicating dimensions, weights, required clearances, and methods of assembly or components.

2. Product Data

a. Submit copies of manufacturer's latest published literature for materials specified herein for approval; obtain approval before ordering materials.

b. Data shall include manufacturer's technical product data, including installation instructions for each type of support and anchor. Submit pipe hanger and support schedule showing Manufacturer's figure number, size, location, and features for each required pipe hanger and support.

3. Maintenance Data: Submit maintenance data and parts list for each type of support and anchor. Include this data, product data, and shop drawings in maintenance manual in accordance with requirements of Division 1.

1.04 DELIVERY, STORAGE AND HANDLING

A. Exercise proper care in the handling of work so as not to injure the finished surfaces, and protect the work from damage after it is in place.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Horizontal Piping Hangers and Supports

1. Except as otherwise indicated, provide factory-fabricated horizontal piping hangers and supports complying with MSS SP-58, of one of the following MSS types listed to suit horizontal piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

2. Adjustable Steel Clevis Hangers: MSS Type 1.

3. Split Pipe Rings: MSS Type 11.

4. Adjustable Roller Hangers: MSS Type 43.
5. Pipe Roll Complete: MSS Type 44.
6. Pipe Rolls and Plates: MSS Type 45.
7. Adjustable Pipe Roll Stands and Base: MSS Type 46.

B. Vertical Piping Clamps

1. Except as otherwise indicated, provide factory-fabricated vertical piping clamps complying with MSS SP-58, of one of the following types listed to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.
2. Extension Pipe (2-Bolt) Riser Clamps: MSS Type 8.
3. Carbon or Alloy Steel (4-Bolt) Riser Clamps: MSS Type 42.

C. Hanger Rod Attachments

1. Except as otherwise indicated, provide factory-fabricated hanger rod attachments complying with MSS SP-58, of one of the following MSS types listed to suit horizontal piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger rod attachments to suit hanger rods. Provide copper-plated hanger rod attachments for copper piping systems.
2. Steel Turnbuckles: MSS Type 13.
3. Steel Clevises: MSS Type 14.
4. Swivel Turnbuckles: MSS Type 15.
5. Malleable Iron Sockets: MSS Type 16.
6. Steel Weldless Eye Nuts: MSS Type 17.

D. Building Attachments

1. Except as otherwise indicated, provide factory-fabricated building attachments complying with MSS SP-58, of one of the following MSS types listed to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper piping systems.
2. Side Beam or Channel Clamps: MSS Type 20.
3. Welded Beam Attachments: MSS Type 22.
4. C-Clamps: MSS Type 23.
5. Side Beam Clamps: MSS Type 27.
6. Steel Beam Clamps W/Eye Nut: MSS Type 28.
7. Malleable Beam Clamp with Extension Piece: MSS Type 30.
8. Steel Brackets: One of the following for indicated loading:

a. Light Duty: MSS Type 31.

b. Medium Duty: MSS Type 32.

c. Heavy Duty: MSS Type 33.

E. Saddles and Shields

1. Except as otherwise indicated, provide factory-fabricated saddles or shields under piping hangers and supports for insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.

2. Steel Pipe Covering Protection Saddles: MSS Type 39; fill interior voids with segments of insulation matching adjoining insulation.

3. Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.

4. Thermal Hanger Shields: Construct of 360 degree insert of high density, 100 psi, waterproofed asbestos-free calcium silicate; encase in 360 degree sheet metal shield. Provide assembly of same thickness as adjoining insulation.

5. Approved Manufacturers

a. Elcen Metal Products Co.

b. Pipe Shields, Inc.

F. Spring Hangers and Supports

1. Except as otherwise indicated, provide factory-fabricated spring hangers and supports complying with MSS SP-58, of one of the following MSS types listed to suit piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select spring hangers and supports to suit pipe size and loading.

2. Spring Cushion Roll Hangers: MSS Type 49.

G. Approved Manufacturers

1. Elcen Metal Products Co.

2. Fee & Mason Mfg. Co.; Div. Figgie International.

3. ITT Grinnell

H. Miscellaneous Materials

1. Metal Framing: Provide products complying with NEMA STD ML 1.

2. Steel Plates, Shapes and Bars: Provide products complying with ASTM A36.

3. Cement Grout: Portland cement (ASTM C150, Type I or Type III) and clean uniformly graded, natural sand (ASTM C404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum amount of water required for placement and hydration.

4. Heavy-Duty Steel Trapezes: Fabricate from steel shapes; select for loads required; weld steel in accordance with AWS standards.

5. Pipe Guides: Provide factory-fabricated guides, of cast semi-steel or heavy

fabricated steel, consisting of bolted 2-section outer cylinder and base with 2-section guiding spider bolted tight to pipe. Size guide and spiders to clear pipe and insulation (if any), and cylinder. Provide guides of length recommended by manufacturer to accommodate travel.

I. Roof Equipment Supports

1. Construct roof equipment supports using minimum 18 gauge galvanized steel; fully miter and weld corners; 3 inch cant, internal bulkhead reinforcing, integral base plates, pressure treated wood nailer, and 18 gauge galvanized steel counterflashing.

2. Configuration: Construct to sizes as indicated, compensate for slope in roof so top of support is dead level.

3. Approved Manufacturers

   a. Custom Curb, Inc.

   b. Pate Co.

   c. Thycurb Div.; Thybar Corp.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions at the job site where work of this section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.02 PREPARATION

A. Examine the Contract Drawings and specifications in order to insure the completeness of the work required under this Section. Provide supplementary parts necessary to complete work, though not specifically indicated on Drawings or specified herein.

B. Verify measurements and dimensions at the jobsite and cooperate in the coordination and scheduling of the work of this Section with the work of related trades, so as not to delay job progress.

C. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.

D. Prior to installation of hangers, supports, anchors and associated work, Contractor shall meet at project site with installer of each component of associated work, inspection and testing agency representatives (if any), installers of other work requiring coordination with work of this section and Architect for purpose of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified.

3.03 INSTALLATION

A. Installation of Attachments: Install attachments at required locations within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, anchors, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts. Do not support or hang from metal decking.

B. Installation of Hangers and Supports

1. Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69. Arrange for grouping of parallel runs of horizontal piping to support together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69. Where supporting piping of various sizes together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

2. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.

3. Support fire-water piping independently of other piping.

4. Prevent electrolysis in supports in direct contact with copper and brass pipe tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.

5. Hangers, Supports, Anchors and Guides

a. Support, anchor and guide piping to preclude failure or deformation. Construct and install hangers, supports, anchors, guides and accessories in conformance with the Code for Pressure Piping ANSI B-31.1, latest edition, as a minimum requirement. Where specification requirements are more stringent than the code, the specification shall apply. Do not use wire, tape or metal bands.

b. Fasten piping securely to the structure without overstressing any portion of the supports or the structure itself. Provide sufficient intermediate steel to transfer loads to areas where they can safely be accommodated. Secure pipe supports, anchors and guides to steel by welded brackets, beam clamps, or by fastening rods over the beam top flange, and to concrete by means of inserts, or if greater load carrying capacity is required, embed by means of steel fishplates in the concrete above the reinforcement rods.

6. Provisions for Movement

a. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to

facilitate action of expansion joints, expansion loops, expansion bends and similar units.

b. Load Distribution: Install hangers and supports so as not to transmit piping live and dead loading and stresses from movement to connected equipment.

c. Pipe Slopes: Install hangers and supports to provide pipe slopes, and so as not to exceed maximum pipe deflections allowed by ANSI B31 Pressure Piping Codes.

d. Insulated Piping: Comply with the following installation requirements.

1) Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.

2) Shields: Where low compressive strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields. For pipe 8 inches and over, install approved insulation saddles.

3) Saddles: Where insulation without vapor barrier is indicated, install protection saddles to match specified insulation thickness. For hot ferrous piping, weld to pipe. For insulated cold pipes and nonferrous piping, install hangers outside insulation and provide 12 gauge semi-cylindrical protection shield, minimum 12 inches long. To prevent crushing insulation, provide rigid insulation under shield.

e. Approved Manufacturer –

i) Shields

ii) Interior Acoustic

iii) Inc. Flexible Barrier

7. Support vertical risers by riser clamps; install below pipe hubs, couplings or lugs welded to the pipe. Hang the riser by 2 rods; connect to the clamp and fasten to the structure below the slab, except that where the clamp is hidden from view or is located in a pipe shaft or in an equipment area, the riser may be supported by resting the clamp on top of the floor slab or pipe sleeve.

8. Support piping and tubing at intervals of not more than 10 feet on straight runs, and at changes in direction. Maximum deflection of 1/8 inch.

9. Support hub and spigot and bell and spigot pipe and fittings at each individual fitting, at changes in direction and at intervals of not more than 5 feet on straight runs.

10. Unless otherwise indicated, hang horizontal piping located more than 2 feet above the floor. Support piping located within 2 feet of the floor on stands or piers.

11. Support piping in Mechanical Equipment Rooms connected within 50 feet of rotating or reciprocating equipment (e.g. pumps), on combination spring and double rubber vibration isolating hangers.

12. Provide anchors at changes in direction for water pipes through which outside pumping sources may be connected and where water velocities may exceed system design values.

C. Installation of Anchors

1. Install anchors at proper locations to prevent stresses from exceeding those permitted by ANSI B31, and to prevent transfer of loading and stresses to connected equipment.

2. Fabricate and install anchor by welding steel shapes, plates and bars to piping and to structure. Comply with ANSI B31 and with AWS standards.

3. Where expansion compensation is indicated, install anchors to limit movement of piping and forces to maximums recommended.

4. Anchor Spacings: Where not otherwise indicated, install anchors at ends of principal pipe runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors required to accommodate both expansion and contraction of piping.

D. Equipment and Piping Supports

1. Provide concrete housekeeping bases for floor-mounted equipment furnished as part of the work of Division 23. Size bases to extend minimum of 4 inches beyond equipment base in any direction; and 4 inches above finished floor elevation. Construct of reinforced concrete, roughen floor slab beneath base for bond, and provide steel rod anchors between floor and base. Locate anchor bolts using equipment manufacturer's templates. Chamfer top and edge corners.

2. Provide structural steel stands to support equipment and/or piping not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings. For piping located outdoors aboveground, provide concrete foundations under each support stand with support stand anchored to concrete.

3. Furnish roof equipment supports to Contractor for installation as part of work of

E. Steel relief and equipment piping shall be anchored at 1st floor slab, supported at 2nd floor slab with vibration isolators and guided at roof slab. Install anchors, guides and supports per Specifications.

3.04 ADJUSTING AND CLEANING

A. Hanger Adjustment: Adjust hangers so as to distribute loads equally on attachments.

B. Support Adjustment: Provide grout under supports so as to bring piping and equipment to proper level and elevations.

C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touchup paint.

END OF SECTION

SECTION 230548
VIBRATION ISOLATION AND SIESMIC RESTRAINT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide vibration isolation in accordance with the Contract Documents.

1.02 WORK INCLUDED

A. Vibration isolation elements for piping and equipment.

1.03 PERFORMANCE REQUIREMENTS

A. Wind-Restraint Loading:
   1. Basic Wind Speed: As determined by project structural engineer
   2. Building Classification Category: As determined by project structural engineer
   3. Minimum 10 lb/sq. ft. (48.8 kg/sq. m) multiplied by the maximum area of the HVAC component projected on a vertical plane that is normal to the wind direction, and 45 degrees either side of normal.

B. Seismic-Restraint Loading:
   1. Site Class as Defined in the IBC: C
   2. Assigned Seismic Use Group or Building Category as Defined in the IBC: II
   3. Component Importance Factor: Non-life safety systems = 1.0, Non-life safety systems = 1.5
   4. Design Spectral Response Acceleration at Short Periods (0.2 Second) and at 1-Second Period: As determined by seismic restraint professional engineer of record (SRPER) responsible for vibration isolation and seismic restraint calculations and details.

C. References
   1. SMACNA - Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems.
   2. SMACNA - HVAC Systems Duct Design, 1990 3rd edition.
   3. ASTM Salt Spray Test Standards and Federal Test Standard No. 14.

D. Standards
   1. ASHRAE 2007/47
   2. ASHRAE 2003/43

1.04 SUBMITTALS

A. Manufacturer's Data

   1. Catalog cuts and data sheets on specific vibration isolators to be utilized showing compliance with the specifications.

   2. An itemized list showing the items of equipment or piping to be isolated, the

isolator type of model number selected, isolator loading and deflection, and reference to specific drawings.

3. Written approval of the base design to be obtained from the equipment manufacturer.
4. Floor span if the equipment is to be supported by structure above grade.
5. Horsepower of each motor, and rpm of both driven and driver, in each supported unit.
6. Calculated horsepower transmitted to the structure through the vibration isolation as applied.
7. Deflection recommended by the ASHRAE Systems Guide, in inches.
8. Scheduled deflection of each isolator. Identification of each isolator selected by model number and spring color.
9. Deflection of each isolator under the calculated load, actual loaded and unloaded measurable spring height.
10. The loading at which each isolator would be fully compressed to solid.
11. The load at which each isolator would operate at the deflection recommended by the ASHRAE Guide, and at scheduled deflection.

B. Shop Drawings

1. Drawings showing equipment base constructions for each machine, including dimensions, structural member sizes and support point locations.
2. Drawings showing methods of suspension, support guides for piping and ductwork.
3. Drawings showing methods for isolation of pipes and ductwork piercing walls and floor slabs.
4. Concrete and steel details for bases including anchor bolt locations.
5. Provide installation instructions, drawings and field supervision to assure proper installation and performance.
6. Concrete and steel details for all inertia blocks.
7. Vibration isolation devices: catalog cuts, isolation efficiencies and deflections.
8. Anchor bolt locations.
9. Reinforcing and template steels.
10. Quality Assurance Provisions.
11. Samples: Provide one sample of each type of vibration isolator in use on the project.
12. Final Inspection Report

1.05 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

D. Provide control of excessive noise and vibration in the buildings due to the operation of machinery or equipment, and/or due to interconnected piping, ductwork or conduit.

1. All vibration isolators shall have either known undeflected heights or calibration markings so that, after adjustment, when carrying their load, the deflection under load can be verified, thus determining that the load is within the proper range of the device and that the correct degree of vibration isolation is being provided according to the design.
2. All isolators shall operate in the linear portion of their load versus deflection curve. Furnish load versus deflection curves linear over a deflection range of not less than 50% above the design deflection.
3. The ratio of lateral to vertical stiffness to be not less than 0.9 nor greater than 1.5.
4. The theoretical vertical natural frequency for each support point, based upon load per isolator and isolator stiffness shall not differ from the design objectives for the equipment as a whole by more than ±10%.
5. All neoprene mountings shall have a Shore hardness of 40 to 65, after minimum aging of 20 days or corresponding oven-aging.

E. Adhere to ASHRAE Guide 1995 Chapter 50.

F. Comply with New York City Building Code

G. Manufacturer responsibilities include:

1. Determine vibration isolation sizes and locations.
2. Provide piping and equipment isolation systems as scheduled or specified.
3. Guarantee specified isolation system deflection.
4. Provide installation instructions and drawings.
5. Substitution of "Internally Isolated" mechanical equipment in lieu of the specified isolation of this Section must be approved for individual equipment units, and is

acceptable only if required acceleration loads are certified in writing by the equipment manufacturer, and stamped and sealed by a acoustical consultant.

H. Substitution of internally isolated mechanical equipment in lieu of the specified isolation of this Section must be approved for individual equipment units and is acceptable only if above acceleration loads are certified in writing by the equipment manufacturer and stamped and sealed by a licensed civil or structural engineer.

I. Purchased and/or fabricated equipment must be designed to safely accept external forces of 1.0g load in any direction for all rigidly and resiliently supported equipment, piping and ductwork without failure and permanent displacement of the equipment. Life safety equipment such as fire pumps, smoke exhaust fans, emergency generators and other life safety designated equipment must be capable of accepting external forces of up to 1.5g in any direction without permanent displacement or failure of the equipment.

J. Vibration isolation firms having a minimum ten years experience designing and installing vibration isolation and seismic restraint systems shall be qualified to provide the materials and installation required by this section. Project listings shall be provided including geographical location and a reference contact.

PART 2 - PRODUCTS

2.01 DESCRIPTION

A. Subject to compliance with requirements specified herein, provide vibration isolation materials, bases and systems by one of the following or approved equal:

1. Kinetics Noise Control, Incorporated

   6300 Ireland Place, P.O. Box 655
   Dublin, Ohio 43017
   614-889-0480

2. Mason Industries, Incorporated

   350 Rabro Drive
   Hauppauge, New York 11788
   516-348-0282

3. Vibration Mountings & Controls, Inc.

   113 Main Street
   Bloomingdale, NJ 07403
   201-838-1780

B. Product of one manufacturer.

C. Where listed, references are to Kinetics Noise Control, Inc. (K.N.C.), Mason Industries, Inc. (M.I.I), and Vibration Mountings and Controls, Inc. (V.M.C.I.).

D. Where exposed to corrosive elements: corrosion protected.

2.02 VIBRATION ISOLATOR GENERAL REQUIREMENTS

A. All vibration isolators shall have either known undeflected heights or other markings so

that after adjustment, when carrying their load, the deflection under load can be verified, thus determining that the load is within the proper range of the device and that the correct degree of vibration isolation is being provided according to the design.

B. All isolators shall operate in the linear portion of their load versus deflection curve. Load versus deflection curves shall be furnished by the manufacturer and shall be linear over a deflection range 50% above the design deflection.

C. The ratio of lateral to vertical stiffness shall not be less than 1.0 or greater than 2.0.

2.03 VIBRATION ISOLATORS

A. Spring type:

1. Spring isolators shall incorporate the following:
   a. Minimum diameter of 0.8 of the loaded operating height.
   b. Corrosion resistance where exposed to corrosive environment with:
      1) Springs cadmium plated and neoprene coated.
      2) Hardware cadmium plated.
      3) All other metal parts hot dip galvanized.
   c. Reserve deflection (from loaded to solid height) of 50% of rated deflection.
   d. Leveling device.
   e. 1/4-inch thick neoprene acoustical base pad.
   f. Designed and installed so that ends of springs remain parallel.
   g. Adequate operating clearance.
   h. Non-resonant with equipment forcing frequencies or support structure natural frequencies.

2. Type "SPNH": spring hanger rod isolators shall incorporate the following:
   a. Spring element seated on a steel washer within a neoprene cup.
   b. Steel retainer box encasing the spring and neoprene cup.
   c. Neoprene bushing for lower rod hole to prevent steel- Spring diameters and hanger box lower hole size large enough to permit hanger rod to swing through a 30° arc before contacting the hole and short- circuiting the spring.
   d. One of the following:
      1) Type 30: M.I.I.

2) Type SH30A: V.M.C.I.

3) Type SH: K.N.C.

B. Elastomer mounting types:

1. All elastomer isolators shall incorporate the following:

a. Bolt holes for bolting to equipment base.

b. Bottom steel plates for bolting to sub-base as required.

c. Unit type design moulded in black oil-resistant neoprene.

d. All metal surfaces shall be neoprene covered.

e. Neoprene to be compounded to meet the following:

1) Not greater than 50 durometer.

2) Maximum tensile strength 2000 psi.

3) Minimum elongation 300%.

4) Maximum compression set at 25% of the original deflection.

2. Type "D": Double deflection neoprene mount.

a. Rated deflection minimum 0.35 inches.

b. One of the following:

1) Type ND: M.I.I.

2) Type RD: V.M.C.I.

3) Type RD: K.N.C.

3. Type "F": Pad type neoprene mountings.

a. 5/16-inch minimum thickness.

b. 50 psi maximum loading.

c. Ribbed or waffled design.

d. 1/16-inch deflection per pad thickness.

e. 1/16-inch galvanized steel plate between multiple layers of pad thickness.

f. Suitable bearing plate to distribute load.

g. One of the following:

1) Type W: M.I.I.

2) Type Shearflex: V.M.C.I.

3) Type NP: K.N.C.

4. Type ADA (Pipe Anchor):

   a. All directional acoustical pipe anchor, consisting of telescopic arrangement of two sizes of steel tubing separated by a minimum of ½" thickness of Elastomer Pad.

   b. Vertical restraints shall be provided by a similar material arranged to prevent vertical travel.

   c. Allowable loads on isolation materials shall not exceed 500 psi and the design shall be balanced for equal resistance in any direction.

   d. Mason type ADA.

5. Type HL (Elastomer isolator):

   a. Laminated canvas duct and neoprene, maximum loading 1,000 psi, minimum ½" thick.

   b. Load distribution plate where attachment to equipment bearing surface is less than 75% of the pad area.

   c. Mason Industries Type HL or as approved.

2.04 FLEXIBLE CONNECTORS

A. Type "FC-1": Flexible stainless hose.

1. Braided flexible metal hose.
2. 3-inch pipe size and smaller with male nipple fittings.
3. 3-inch and larger pipe size with fixed steel flanges.
4. Suitable for operating pressure with 4:1 minimum safety factor.
5. Length as shown on manufacturer's certified drawings.
6. Connectors to be one of the following or equal:

   a. Type BSS: M.I.I.

   b. Type MFE, HNE, NE: V.M.C.I.

   c. WNE, BF

B. Type "FC-2": Flexible duct connections to fans.

1. 30 ounce wovenglass fiber coated with neoprene, sewn together at the edges and joints.
2. 6" long and held in place with 1". wide bands of 12 ga. galvanized steel bolted to duct and to outlets and inlets of the units and fans with 1/8" stove bolts, 5" o.c. Metal connections 3" wide on either side of the flexible material, as provided by the manufacturer, may also be used.

3. One of the following or equal:

   a. Ventglass, manufactured by Ventfabrics, Inc., Chicago, IL 312-775-4477

   b. Insulflex, manufactured by DuroDyne, Farmingdale, NY 516-249-9000

2.05 ACCEPTABLE MANUFACTURERS

A. Refer to products section.

B. Vibration Eliminator Co. (VEC)

2.06 SEISMIC-RESTRAINT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amber/Booth Company, Inc.
2. Kinetics Noise Control.
3. Mason Industries.
4. Vibration Eliminator Co., Inc.
5. Vibration Mountings & Controls, Inc.

B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports OSHPD or an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

D. Restraint Cables: ASTM A 492 stainless-steel cables with end connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.

E. Retain first paragraph below for strengthening resistance of hanger rods against seismic forces that may cause buckling of rods; delete if detailed on Drawings. Use with either channel- or cable-type bracing assemblies when required to counter seismic forces. Detail fabrication and indicate locations on Drawings.

F. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.

G. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

I. Expansion-type anchor bolts are not permitted by SEI/ASCE 7 for nonisolated equipment in excess of 10 hp (7.46 kW).

J. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

K. Restraints

1. Type SNB (Snubbers): Snubbers shall be Mason "Z-1011" or "Z-1225", or equal provided by the manufacturers listed in Section 2.1.A, sized in accordance with the manufacturer's recommendations to suit the application. Snubbers shall provide restraint during on-off cycling. Snubbers shall not have rigid connection to vibration isolated equipment or base when in normal operation.

2. Type THR (Thrust Restraints): Shall consist of a spring element in series with a neoprene pad. The unit shall be designed to have the same deflection as specified for the isolators supporting the equipment. The spring element shall be contained within a steel frame and be designed so it can be preset at the factory for thrust and be adjusted in the field to allow for a maximum of 1/4-in. movement during starting or stopping of the equipment. The assembly shall be furnished complete with rods and angle brackets for attachment to both the equipment and the adjacent fixed structural anchor. Thrust restraints shall be Mason "WB" or equal provided by the manufacturers listed in Section 2.1.A.

3. Type CR (Cable Restraints): Galvanized aircraft cable. Cable assembly shall be fitted with rope thimbles and secured with a minimum of two U-bolts with lock nuts per end. Allowed loads shall contain a safety factor of three when worse case loading applied to one cable. Cable shall be installed with 1/4-in. slack to prevent the transmission of vibration to the structure.

4. Type RBR (Rigid Bracing Restraint): Rigid braces shall consist of steel angles or channels to resist seismic loads with a minimum safety factor of two and arranged to provide all directional restraint. Rigid brace end connectors shall be steel assemblies that swivel to the final installation angle and utilize two through bolts to provide proper attachment. Where rigid bracing is required for vibration isolated services, the acoustic consultant shall be notified.

PART 3 - EXECUTION

3.01 GENERAL

A. Install in accordance with manufacturer's written instructions. Vibration isolators must not cause any change of position of equipment or piping resulting in piping stresses or misalignment.

B. Isolate mechanical equipment from the building structure by means of noise and vibration

isolators as scheduled on the Drawings and in these specifications.

C. Piping and ductwork to be isolated must pass freely through walls and floors without rigid connections. Maintain 3/4 inch to 1¼ inch clearance around outside surfaces of piping or ductwork at penetration points. Pack this clearance space tightly with fiberglass, and caulk airtight after installation of piping or ductwork.

D. Make no rigid connections between equipment and building structure that degrades the noise and vibration isolation system specified herein.

E. Loop electrical circuit connections to isolated equipment to allow free motion.

F. Bring to the Engineer's attention prior to installation any conflicts with other trades which will result in unavoidable rigid contact with equipment or piping as described herein, due to inadequate space or other unforeseen conditions. Corrective work necessitated by conflicts after installation will be at the responsible contractor's expense.

G. Support vertical piping loads, including water strainers, and valves between pump base elbow supports and the suction and discharge header piping by means of the pump base spring isolators without stress or strain to the pump housing.

H. Do not install any equipment, piping or conduit which makes rigid contact with the "building" unless permitted in this Specification. Building includes, but is not limited to, slabs, beams, columns, studs and walls.

I. Coordinate work with other trades to avoid rigid contact with the building. Inform other trades following work, such as plastering or electrical, to avoid any contact which would reduce the vibration isolation.

3.02 EQUIPMENT ISOLATORS

A. Mount roof mounted equipment on steel dunnage or roof curb as indicated on plans. Provide approved seismic restraint anchor to the structure.

B. Support each fan and motor assembly on a single structural steel frame. Provide flexible duct connections at inlet and discharge of fans.

C. Provide brackets to accommodate the isolator. Manufacturer to specify the vertical position and size of the bracket.

D. Maintain a minimum operating clearance between the equipment frame on rigid steel base frame and the housekeeping pad of 1 inch. Maintain a minimum operating clearance between concrete inertia and base and housekeeping pad or floor of 2 inches.

E. Temporarily support the structural steel or concrete inertia base with blocks or shims, as appropriate, prior to the installation of the machine or isolators.

F. Install the isolators without raising the machine and frame assembly.

G. Adjust the isolator after the entire installation is complete and under full operational load so that the load is transferred from the blocks to the isolator. When all isolators are properly adjusted, the blocks or shims will be barely free and shall be removed.

H. Verify that all insulated isolator and mounting systems permit equipment motion in all directions. Adjust or provide additional resilient restraints to flexibly limit equipment start-up lateral motion to ½ inch.

I. Prior to start-up, clean out all foreign matter between bases and equipment. Verify that there are no isolation short circuits in the base or isolators.

3.03 ADDITIONAL REQUIREMENTS

A. Diagonal thrust restraint shall be as described for Type C hanger with the same deflection as specified for the spring mountings. The spring element shall be designed so it can be pre-set for thrust and adjusted to allow for a maximum of ¼" movement at start and stop. Diagonal restraints shall be attached at the centerline of thrust. Restraint shall be Mason Type WB, or as approved.

B. All piping and ductwork to be isolated shall freely pass through walls and floors without rigid connections. Penetration points shall be sleeved or otherwise formed to allow passage of piping or ductwork, and maintain ¾" to 1¼" clearance around the outside surfaces. This clearance space shall be tightly packed with fiberglass, and caulked airtight after installation of piping or ductwork.

C. All HVAC piping vertical risers larger than 2" in diameter shall be isolated from the building structure by means of noise and vibration isolation guides and supports.

D. Isolators shall be installed with the isolator hanger box attached to, or hung as close as possible to, the structure. Hanger rods shall be aligned to clear the hanger box.

E. Isolators shall be suspended from substantial structural members, not from slab diaphragm unless specifically permitted.

3.04 PIPING

A. All piping, except fire standpipe systems, are included under this Section.

B. Installation:

1. Isolate piping outside of shafts as follows:
   a. All water piping and boiler breeching in machine rooms.
   b. Piping where exposed on roof.
   c. Water piping within 50 ft., or 100 diameters if greater than 50 ft. from connected rotating equipment and pressure reducing stations.
2. All piping 2" and over located in mechanical equipment rooms, and for a minimum of fifty (30) feet or 50 pipe diameters, whichever is greater, from connection to vibrating mechanical or electrical equipment, shall be isolated from the building structure by means of noise and vibration isolation hangers,Type B
3. Horizontal suspended pipe 2" and smaller shall be suspended by Type F isolator with a minimum _" deflection. Water pipe larger than 2" shall be supported by

Type E isolator with a minimum 1", or same static deflection as isolated equipment to which pipe connects, whichever is greater.

4. Horizontal pipe floor supported at slab shall be supported via Type B, with a minimum static deflection of 1" or same deflection as isolated equipment to which pipe connects, whichever is the greater.

5. Vertical riser pipe supports shall utilize Type HL for pipes up to 2 inches, Type ADA for pipes larger than 2 inches.

6. Vertical riser guides, if required, shall avoid direct contact of piping with building.

7. Pipe anchors, where required, shall utilize resilient pipe anchors, Mason Industries Type ADA, or equivalent, to avoid direct contact of piping with building.

8. Pipe extension and alignment connectors: Provide connectors at riser takeoffs, cooling and heating coils, and elsewhere as required, to accommodate thermal expansion and misalignment.

9. Adjust, as required, all isolators to eliminate all contact of the isolated rod with the hanger rod box retainer or short circuiting of the spring.

3.05 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

E. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Division 23 Section "Hydronic Piping" for piping flexible connections.

3.06 FIELD QUALITY CONTROL

F. Perform tests and inspections.

G. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice.
3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

H. Remove and replace malfunctioning units and retest as specified above.

I. Prepare test and inspection reports.

3.07 ADJUSTING

J. Adjust isolators after piping system is at operating weight.

K. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

L. Adjust active height of spring isolators.

M. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.08 HVAC VIBRATION-CONTROL DEVICE SCHEDULE

N. Supported or Suspended Equipment:

Item / Equipment	Location & Mounting	Isolation Type	Min. Deflection
Rooftop Units	Roofcurb mounted	Refer to Section - 237432	2.0 inches
Utility Exhaust Fans	Roof, mounted on steel dunnage / equipment base	Spring Isolators	2.0 inch
Air Cooled Condensing Units	Equipment base	MWP	0.25 inches
Indoor Air Conditioning Unit	Ceiling Hung	SPNH	2 inch
Fan Coil Unit, Unit Heaters	Ceiling Hung	NH	0.5 inch

3.09 INSPECTION

A. On completion of installation of all vibration isolation devices herein specified, the local representative of the isolation materials manufacturer shall inspect the complete system and report in writing any installation errors, improperly selected isolation devices, or other faults that could affect the performance of the system. Contractor shall submit a report to the Architect, including the manufacturer's representative's final report, indicating all isolation reported as properly installed or requiring correction, and include a report by the Contractor on steps taken to properly complete the isolation work.

END OF SECTION

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SECTION 230553
MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. Provide labor, materials, equipment and services, and perform operations required for complete installation of Mechanical Identification and related work as indicated on the drawings and specified herein.

B. Work Included: The work shall include, but not be limited to, the following:

1. Extent of mechanical identification work required by this section is indicated on drawings and/or specified in other Division 23 sections.

2. Types of identification devices specified in this section include:

a. Plastic Pipe Markers.

b. Plastic Tape.

c. Plastic Duct Markers.

d. Engraved Plastic-Laminate Signs.

e. Plastic Equipment Markers.

f. Plasticized Tags.

C. Related Work Specified Elsewhere

1. Basic Mechanical Requirements

2. Mechanical identification furnished as part of factory-fabricated equipment, is specified as part of equipment assembly in other Division 23 sections.

3. Refer to other Division 23 sections for identification requirements at central station mechanical control center; not work of this section.

4. Refer to Division 26 sections for identification requirements of electrical work; not work of this section.

1.02 QUALITY ASSURANCE

A. Materials and work shall conform to the latest edition of reference specifications and industry standards listed below and specified herein and to applicable codes and requirements of local authorities having jurisdiction, whichever is more stringent.

1. ANSI Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.03 SUBMITTALS

A. Submit the following in accordance with the requirements specified under Submittals in Section 23 0500.

1. Product Data: Submit copies of manufacturer's latest published literature for materials specified herein for approval; obtain approval before materials are delivered to the site. Data shall include manufacturer's technical product data and installation instructions for each identification material and device required.

2. Schedules: Submit valve schedule for each piping system; typewrite and reproduce on 8-1/2 inches by 11 inches bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shutoff and similar special uses, by special "flags", in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified.

3. Maintenance Data: Along with product data and schedules, submit manufacturers in maintenance manuals for maintaining identification work specified herein.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide mechanical identification materials manufactured by of one of the following:

1. Brady (W.H.) Co.; Signmark Div.

2. Seton Name Plate Corp.

2.02 MATERIALS

A. Mechanical Identification Materials: Provide manufacturer's standard products of categories and types required for each application as referenced in other Division 23 sections. Where more than single type is specified for application, selection is Architect's option, but provide single selection for each product category.

B. Plastic Pipe Markers

1. Snap-On Type: Provide manufacturer's standard preprinted, semi-rigid snap-on, color-coded pipe markers, complying with ANSI A13.1.

2. Pressure-Sensitive Type: Provide manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers with arrow tape banding both ends to indicate flow direction. Comply with ANSI A13.1.

3. Insulation: Furnish 1 inch thick molded fiberglass insulation with jacket for each plastic pipe marker to be installed on uninsulated pipes subject to fluid temperatures of 125 degrees F or greater. Cut length to extend 2 inches beyond each end of plastic pipe marker.

4. Small Pipes: For external diameters less than 6 inches (including insulation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location; fasten by one of the following methods:

a. Snap-on application of pretensioned semi-rigid plastic pipe marker.

b. Taped to pipe (or insulation) with color-coded plastic adhesive arrow tape, not less than 3/4 inch wide; full circle at both ends of pipe marker, lap tape

1-1/2 inches.

5. Lettering

a. Comply with piping system nomenclature as specified, scheduled or shown, and abbreviate only as necessary for each application length.

b. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

C. Plastic Tape

1. Provide manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.

2. Width: Provide 1-1/2 inches wide tape markers on pipes with outside diameters (including insulation, if any) of less than 6 inches, 2-1/2 inches wide tape for larger pipes.

3. Color: Comply with ANSI A13.1, except where another color selection is indicated.

D. Engraved Plastic-Laminate Signs

1. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated; punch for mechanical fastening except where adhesive mounting is necessary because of substrate.

a. Thickness: 1/16 inch, except as otherwise indicated.

2. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

E. Plastic Equipment Markers

1. Provide manufacturer's standard laminated plastic, color coded equipment markers. Conform to the following color code:

a. Green: Cooling equipment and components.

b. Yellow: Heating equipment and components.

c. Yellow/Green: Combination cooling and heating equipment and components.

d. Brown: Energy reclamation equipment and components.

e. Blue: Equipment and components that do not meet any of the above criteria.

f. For hazardous equipment, use colors and designs recommended by ANSI A13.1.

2. Nomenclature: Include the following, matching terminology on schedules as

closely as possible:

a. Name and plan number.

b. Equipment service.

c. Design capacity.

d. Other design parameters such as pressure drop, entering and leaving conditions, rpm, etc.

3. Size: Provide approximately 2-1/2 inches by 4 inches markers for control devices, dampers, and valves; and 4-1/2 inches by 6 inches for equipment.

F. Plasticized Tags: Manufacturer's standard preprinted or partially preprinted accident prevention tags, of plasticized card stock with matte finish suitable for writing, approximately 3-1/4 inches by 5-5/8 inches, with brass grommets and wire fasteners, and with appropriate preprinted wording including large size primary wording (as examples; DANGER, CAUTION, DO NOT OPERATE).

G. Lettering and Graphics

1. Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.

2. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 3, Air Supply No. 1H, Standpipe F12).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions at the job site where work of this section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.02 PREPARATION

A. Examine the Contract Drawings and specifications in order to insure the completeness of the work required under this Section.

B. Cooperate in the coordination and scheduling of the work of this Section with the work of related trades, so as not to delay job progress.

C. Where applying identification to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.03 INSTALLATION/APPLICATION

A. Piping System Identification

1. Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:

a. Plastic pipe markers, with application system as indicated under "Materials" in this section. Install on pipe insulation segment where required for hot non-insulated pipes.

b. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.

c. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.

d. At access doors and similar access points which permit view of concealed piping.

e. Near major equipment items and other points of origination and termination.

f. Space intermediately at maximum spacing of 15 feet along each piping run.

g. On piping above removable ceilings, except omit intermediately spaced markers.

B. Mechanical Equipment Identification

1. Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:

a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.

b. Meters, gauges, thermometers and similar units.

c. Pumps, condensing units, unit heaters and similar motor-driven units.

d. Rooftop Units, AC units, Condensing Units and similar equipment.

e. Fans, blowers and primary balancing dampers.

f. Strainers, filters, water treatment systems and similar equipment.

2. Lettering Size: Minimum 1/4 inch high lettering for name of unit where viewing distance is less than 2 feet, 1/2 inch high for distances up to 6 feet, and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 of size of principal lettering.

3. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, inform operator of operational requirements,

indicate safety and emergency precautions, and warn of hazards and improper operations.

4. Optional Use of Plasticized Tags: At Architect's option, where equipment to be identified is concealed above acoustical ceiling or similar concealment, plasticized tags may be installed within concealed space to reduce amount of text in exposed sign (outside concealment).

3.04 ADJUSTING AND CLEANING

A. Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

3.05 EXTRA STOCK

A. Furnish minimum of 5 percent extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.

END OF SECTION

SECTION 230593
TESTING, ADJUSTING AND BALANCING (TAB) OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This section specifies administrative and procedure requirements regarding mechanical work. Additional requirements are specified in various sections of Division 23 and also may be required during the execution of work due to project conditions.

B. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

C. All field applied adhesives, sealants (used as fillers), prime painting, and finished painting shall comply with the low VOC requirements called out in Division 1.

D. Related Work Specified Elsewhere
1. General Conditions Section 01 0000
2. Addendum to General Conditions
3 Section 23 0500 – Basic Mechanical Materials and Methods

D. Work Included: The work of this section shall include, but not be limited to, the following:

1. Perform balancing of air distribution systems, and adjustment of air outlets etc. for HVAC systems.

2. Perform balancing of central station equipment such as fans, and related equipment.

3. Installing Contractor shall furnish non-testing, adjusting and balancing labor, including standby electrician, materials, instruments and power required for testing.

4. Test equipment and systems which normally operate during certain seasons of the year during the appropriate season. Perform tests on individual equipment, systems and their controls. Whenever the equipment or system

under test is interrelated and depends upon the operation of other equipment, systems and controls for proper performance, the latter shall be operated simultaneously with the equipment or system being tested.

5. Completely balance fans and duct systems by the adjustment of sheaves, dampers, registers and other volume and diverting control devices, to obtain the air quantities indicated on the design drawings. The Installing Contractor shall replace sheaves if required to meet design conditions.

6. Perform balancing of air distribution systems and adjusting of terminal devices, including:

   a. Adjust and set dampers, deflecting vanes, discharge vanes and accessories to achieve proper air distribution and patterns in the supply and exhaust air systems including terminal devices.

   b. Adjust and set belt driven fans to achieve design total delivered air quantities.

   c. Perform air distribution duct systems leakage tests.

7. Inspect the function and verify the operation of temperature control devices associated with the equipment and systems being balanced. Note deviations from specification requirements.

10. Check installation of vibration isolators and test for design ratings.

11. Prepare and submit reports and other data as specified.

12. Provide instruments required for testing, adjusting and balancing operations. Retain possession of instruments and remove from site at completion of services.

13. Refer to other sections of Division 23 for related requirements.

1.02 SYSTEM DESCRIPTION

A. Terminology

1. The organization performing the services described in this section will also be referred to as "Balancing Contractor".

2. The words "Installing Contractor" used in this section refer to the Contractors or Subcontractors responsible for the furnishing and installation of the work specified in other sections of Division 23.

1.03 QUALITY ASSURANCE

A. The organization which performs the service shall be independent and be a current

member in good standing, certified to perform services required for the project, of Associated Air Balance Council (AABC).

B. Submit proof of having balanced and tested at least three projects of similar size and scope.

C. Employment of a Testing, Adjusting and Balancing (TAB) Organization: Engage a qualified independent organization to perform the specified services; pay costs for these services. Employment of the organization shall in no way relieve Contractor's obligation to perform Work of the Contract.

D. The work performed by Balancing Contractor shall be under the direct supervision of a Licensed Professional Engineer, a full-time employee of Balancing Contractor. Technicians performing the work must be properly trained, experienced and full-time employees of Balancing Contractor.

E. Within 30 days after award of contract, submit to Commissioner the name of the organization proposed to perform the services. Should separate firms perform services for air and hydronic portions, specify in writing the firm which will have managerial responsibilities for coordination of entire testing and balancing process.

F. Comply with applicable procedures and standards of the certification sponsoring association; either:

1. "National Standards for Total Systems Balance", latest edition, by AABC.

2. Calibration and maintenance of instruments shall be in accordance with requirements of the standards. Instruments used in the performance of the Work must have been calibrated within 6 months preceding the date of usage. Calibration histories for each instrument shall be made available for examination.

3. Accuracy of measurements shall comply with requirements of the standards.

G. Air Distribution Duct Leakage Test Verification

1. Installing Contractor shall perform leakage tests on duct systems. Verify and record the results of each test on standard AABC test forms and submit copies of same to the Commissioner for review.

2. Mark tested sections of ductwork with the date and initials of the balancing technician. Perform tests before duct sections are concealed and before systems are balanced.

3. Verify and record the results of leakage tests, both successful and unsuccessful.

1.04 SUBMITTALS

A. Submit the following in accordance with the requirements specified under Submittals in Section 23 0500.

1. Submit copies of documentation to confirm compliance with Quality Assurance provisions:

   a. Organization supervisor and personnel training and qualifications.

   b. Specimen copy of each of the report forms proposed for use.

2. At least 15 days prior to starting field work, submit copies of a complete list of instruments proposed to be used, organized in appropriate categories, with data sheets for each, showing:

   a. Manufacturer and model number.

   b. Description and use when needed to further identify the instrument.

   c. Size or capacity range.

   d. Latest calibration date.

3. Commissioner will review submittals for compliance with Contract Documents, and will return one set marked to indicate:

   a. Discrepancies noted between data shown and Contract Documents.

   b. Additional, or more accurate, instruments required.

   c. Requests for recalibration of specific instruments.

4. Submit copies of written reports tri-monthly, during the course of construction, of potential or developing problems and delays relating to the work being provided where such problems may adversely affect the proper balancing of the equipment or systems. The last report shall be no later than 1 week before TAB work is to begin.

5. Submit written reports for review upon completion of each major phase of balancing work.

6. Submit reports of delayed testing promptly after execution of those services.

7. Form of Final Reports

   a. Each final reporting form must bear the signature of the person who recorded data and the seal and signature of the TAB supervisor of the reporting organization.

   b. When more then one certified organization performs TAB services, the

firm having managerial responsibility shall make the submittals.

c. Identify instruments used, and last date of calibration of each.

d. Submit final balancing report in accordance with requirements specified herein, modified and expanded to be compatible with the requirements of the installed systems.

1.05 JOB CONDITIONS

A. Procedures

1. Report and review the requirements of the work with Commissioner before starting any field balancing work.

2. Periodically visit the site, at a maximum of three month intervals, during installation of the work. Should any potential or developing problems be discovered relating to materials, equipment or methods being used in the work, and where such problems may adversely affect the testing and adjusting work, immediately report these findings in writing to the Commissioner with recommendations for correction.

B. TAB Preparations

1. Before the TAB Contractor performs the final testing, adjusting and balancing work, the Installing Contractor shall verify the following:

a. Ductwork systems are completely and satisfactorily installed and leak tested.

b. Piping systems are completely and satisfactorily installed and leak tested.

c. Equipment and apparatus fulfill the requirements of the Specifications and that equipment has been properly installed and checked for proper operating characteristics such as proper rotation and running amperage of fan and pump motors to prevent damage to equipment by overload.

d. Systems have been completely installed and operating and the automatic temperature controls have had their final adjustments.

e. New, clean filters have been installed in required systems.

f. Water systems have been completely filled and vented, and strainers cleaned proper to balancing, and that expansion tanks are at prior water level and makeup water valves are operating properly.

C. Coordination and Cooperation

1. Installing Contractors responsible for Work under Division 23 shall provide services outlined and described in other related Division 23 sections.

2. Enlist the aid of Installing Contractors or equipment suppliers, at no cost to City of New York, whenever such aid is necessary for the timely and proper performance of the testing and balancing work.

3. Cooperate with Installing Contractors to effect smooth coordination of the balancing work with the project schedule.

1.06 WARRANTY

A. Provide a National Certification Guarantee from the AABC as applicable for the work performed under this contract.

B. After completion of the work specified under this Section, provide an extended warranty encompassing one full heating season and one full cooling season, during which time any balancing device which had been adjusted earlier as part of this work shall be rechecked and reset when such additional work is deemed necessary by the Commissioner.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 AIR SYSTEM BALANCING AND TESTING

A. Measure air quantities in main ducts by pitot tube and manometer traverse of the entire cross sectional area of the duct. Calibrate manometer to read 2 significant figures in velocity pressure ranges. Where necessary for proper balancing, make similar measurements in branch ducts. Seal openings in ducts for pitot tube insertion with approved plugs. Determine outlet and inlet air quantities in accordance with outlet and inlet manufacturer's recommendations.

1. A main duct is defined as either of the following:

a. A duct serving 5 or more outlets.

b. A duct serving 2 or more branch ducts.

c. A duct emanating from a fan discharge or plenum and terminating at one or more outlets.

2. The intent of this operation is to measure by traverse the total air quantity supplied by the fan and to verify the distribution of air to zones.

B. Submit data in support of supply fan deliveries by the following 4 methods:

1. By summation of the air quantity readings at outlets.

2. By duct traverse of main supply ducts.

3. By a rotating vane traverse across a filter or coil bank.

4. By plotting RPM and static pressure readings on the fan curve. Air density corrections must be indicated.

C. For return air and exhaust fans, summation and duct traversing shall be sufficient.

D. Inspect fan scrolls and remove objects or debris. Inspect coils and remove debris or obstructions. Verify that fire dampers are open.

E. The supply air systems shall be completely balanced prior to the final balancing of the water systems.

F. Upon completion of air and water balancing, duct dampers, plug valves and other throttling devices shall be marked in the final adjusted position.

G. Volume adjusters may be used to balance air quantities at outlets and inlets, providing final adjustments do not produce objectionable drafts or sound levels. Air quantity adjustments by outlet deflectors will not be permitted.

H. For systems with multi- or variable-speed motors, perform balancing with the system operating at high speed.

I. Balance variable air volume (VAV) systems at design (maximum) air flow and then retest at simulated partial load conditions, at (reduced) air quantity designated by Commissioner.

J. For systems handling outdoor air, balance system at the normal minimum outside air condition. Where the system is designed to deliver 100 percent return or a variable amount of outdoor air, repeat the tests for 100 percent return air and maximum outdoor air; the air quantities shall agree with conditions measured under minimum outdoor air operation before the system is considered to be in balance. Adjust dampers to achieve balance and mark position of dampers, so that Contractor for Automatic Temperature Controls may set the damper motors properly.

K. Adjust individual outlets under procedures recommended by the manufacturers of the outlets, or as otherwise approved by Architect. Set outlets for the air pattern required. Adjust and set main supply air dampers for the design air quantities indicated. Make changes in air patterns or settings necessary to achieve correct air balance and to minimize drafts. Mechanical Contractor shall provide blanking plates as required.

L. Measured air quantities shall agree with design air quantities within limits acceptable to the Commissioner. The measurements recorded in the Balancing

Report for the total CFM of branches, and the grand total shall agree with the measured air volume of the fan, including an air quantity not greater than the specified maximum leakage.

M. Before balancing, building shall be completely enclosed with doors, windows and louvers installed and systems completed and in operating condition. Schedule balancing completion at least one week prior to the completion of the building.

N. Before balancing, check fan wheels for proper rotation, uniform clearances between wheel and inlet cones, concentricity with inlet cones and parallelity with scrolls. Check alignment of fan and motor sheaves. Check belt drives for proper and uniform tension. Open duct and air outlet volume dampers and controls which may affect fan performance.

O. Obtain copies of fan pressure-volume-power noise-rating-efficiency characteristics at rated speed. Prepare line drawings of systems with identifying designations for each section of the distribution system and outlets.

P. Set fans at rated speeds for design volumes and pressures. Pressure for supply fans shall include design static pressure across dirty filter. Verify that coils are in factory clean condition. Confirm electrical ratings at these conditions. Simultaneously operate supply and exhaust systems serving common areas on 100 percent outside air or full recirculation throughout balancing period.

Q. Measure flow and pressure in ducts by means of pitot tube and a manometer or U-gauge having a minimum sensitivity of 0.02 inch of water.

R. For round duct over 6 inches (150 mm) diameter make a 10 point pitot tube traverse with 2 sampling points in each of 5 equal annular areas of duct cross-section. For rectangular ducts, take readings at the center point of each rectangle with not less than 16 and a maximum of 64 readings. Center distances between rectangular areas shall be 6 inches (150 mm) maximum. Take readings as far down-stream of fittings as is practicable up to an equivalent of 7 duct diameters.

S. Measure fan and motor speeds with a direct reading or stroboscopic tachometer. Measure amperage and voltage with direct connected or clamp-on instruments.

T. Measure flow at air outlets with an Anemotherm, Shortridge Hood, Velometer, or approved equal instrument as per manufacturer's instructions.

U. Determine actual volume delivery of fans by measuring both fan performance and air flow.

1. Measure and record fan performance data on Fan Data Sheet. Plot operating point on fan pressure-volume curve for both design clean and dirty filter conditions. Indicate impact of increased air flow for clean filter condition based on field tests. Plot bhp on power curve.

2. Measure total system flow in main supply duct by means of pitot tube

traverse.

3. If volumes determined by each method are within 5 percent of one another, continue test. If in excess of 5 percent, notify Architect and have manufacturer check and correct fan; then repeat pitot tube traverse.

4. If measured volumes are within 5 percent of one another but at other than design volume, readjust fan speed for design volume delivery.

V. After adjusting fans, proceed with balancing of main interior systems. Measure and adjust outside air quantities. Adjust maximum and minimum air volumes through outdoor, return and exhaust air combination for both summer and winter cycles in conjunction with automatic controls linkage stops on damper motors. Record and submit outside, return and mixed air temperatures for both cycles after final adjustments.

W. When requested, test outlets and terminal units for performance by means of smoke, air velocity pattern, air temperature pattern and noise level.

X. Test fire and smoke dampers for ease of operation by removing fusible link. After test, replace fusible link and reset damper.

Y. Submit original design drawings including shop drawing changes of duct systems indicating terminal outlets identified by number. Data sheets shall list outlets denoted by the same numbers, including the outlet's size, "K" factor, location, CFM and jet velocity.

3.02 AIR BALANCING DATA

A. Balance systems with fan pressure 0 inches to 6 inches (0-150 mm) W.C. to the following tolerances:

1. Fans: Design volume (with clean filters) plus 5 percent minus 0 percent

2. Terminals: Design volume plus 5 percent minus 0 percent

3. Leakage Class: 6

B. Test Data: Submit to the Commissioner the following test data, arrange by system and area served:

1. Fan or Unit Data

a. Manufacturer, model, and serial number

b. CFM, design (dirty filter)

c. CFM, actual (clean filter)

d. CFM, design (outdoor, return, exhaust)

e. CFM, actual (outdoor, return, exhaust)

f. RPM, design

g. RPM, actual

h. Inlet static pressure (clean filter)

i. Discharge static pressure

j. Total static pressure

k. External static pressure

l. Filter pressure drop

m. Pressure drop across each unit component

n. Heat transfer coil pressure drop

o. Fan curves showing variation of CFM with static pressure at operating RPM and motor loading

2. Motor Data (Rated and Actual)

a. Manufacturer, model, and serial number

b. Horsepower. Actual BHP, MHP

c. Phase

d. Frequency

e. NEMA code letter

f. Rated volts

g. Actual volts

h. Rated amperes

i. Actual amperes

j. Locked rotor amperes

3. Starter Data

a. Manufacturer and model number

b. Heater size/phase

c. Line voltage

d. Ampere rating

e. Control voltage

f. Frequency

4. Air Terminal Data

a. Sketch showing air outlet and inlet locations; assign numbers to terminals.

b. Air terminal manufacturer and model numbers.

c. Size

d. Actual free area

e. Manufacturer's test factor

f. Measured velocity

g. CFM, design

h. CFM, actual

i. CFM, percentage above or below design

5. Outdoor and Exhaust Air Data

a. Size of opening

b. Actual free area

c. Manufacturer's test factor

d. Measured velocity

e. Outdoor air temperature

f. CFM, design (outdoor, exhaust)

g. CFM, actual (outdoor, exhaust)

h. Exhaust air temperature

6. Duct Velocity Traverse Data

a. Fan or Unit No.
b. Traverse location.
c. Design and actual CFM.
d. Duct dimensions and area.
e. Design and actual average velocity.
f. Duct static pressure at test holes, in w.g.
g. Traverse measurements in FPM (show grid pattern).

7. Air Terminal Unit

a. Unit symbol and location.
b. Manufacturer and model number.
c. Design and actual air velocity.
d. Design and actual CFM.

END OF SECTION

SECTION 230700
MECHANICAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Insulation Materials:

   a. Cellular glass.
   b. Flexible elastomeric.
   c. Mineral fiber.

2. Fire-rated insulation systems.
3. Insulating cements.
4. Adhesives.
5. Mastics.
6. Sealants.
7. Factory-applied jackets.
8. Field-applied fabric-reinforcing mesh.
9. Field-applied jackets.
10. Tapes.
11. Securements.
12. Corner angles.

B. Related Sections:

1. Division 21 Section "Fire-Suppression Systems Insulation."
2. Division 22 Section "Plumbing Insulation."
3. Division 23 Section "Metal Ducts" for duct liners.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittal:

1. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.

C. Shop Drawings:

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.

4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties, equipment connections, and access panels.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.
8. Detail field application for each equipment type.

D. Field quality-control reports.

1.2 WORK INCLUDED

1 Piping Insulation.

2 Duct Insulation.

3 Equipment Insulation.

1.3 SUBMITTALS

1 Shop Drawings: Submit list of insulation to be used for each service.

2 Product Data: Manufacturer's latest published data for materials, "R" values and installation.

3 Provide BS&A or MEA numbers.

1.4 QUALITY ASSURANCE

1 All insulating materials to be free of asbestos.

2 Comply with all requirements of ASTM for thermal and moisture transmission.

3 Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

4 Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

5 Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

6 All insulating products and coverings to be U.L. listed.

PART 2 - PRODUCTS

2.1 PIPE INSULATION

A. Materials

1 When the temperature of a fluid falls within the following temperature ranges at any time during the system cycle, provide the minimum insulation thickness indicated.

				Insulation Thickness In Inches for Pipe Sizes In Inches		
Service	Temp. Range °F	Material	Runouts *	1-1/2" and less	2" and less than 4 "	4" and over
Condensate drains above hung ceilings	-	Glass Fiber	1/2	1/2	2	2
Refrigerant	< 40	Glass Fiber	1	1-1/2	2	-
Domestic Water	All Temp	Glass Fiber	1/2	1-1/2	2	2-1/2
Horizontal Storm Water		Glass Fiber	1	1-1/2	2	2-1/2
Refrigerant		Flexible Elastomeric	1.0	1-1/2	2	-
* Runouts is piping directly connected to a terminal unit and not exceeding 12'-0" in length.						

2 Fiberglass Density: Fiberglass pipe insulation in equipment rooms and/or where exposed to be of the sectional type having 6 lbs./cu. ft. density. Other fiberglass insulation to be of the 1-piece type with at least 4 lbs./cu. ft. density.

3 Thermal conductivity of fiberglass to be 0.23 BTU/hr/inch/sq.ft./°F/at a mean temperature of 75°F or better

4 Thermal conductivity of calcium silicate to be 0.32 BTU/hr/inch/sq.ft./°F/at a mean temperature of 100°F or better.

5 When installed in accordance with recommended installation procedures, piping insulation shall provide installed R-values to meet 2010 NYC Energy Conservation Code.

6 Insulation Jackets

Concealed pipes carrying fluids 105° F degrees and above	Factory applied white fire retardant jacket, (ASJ), stapled and banded. Pipes banded with not less than 3 bands per section.
Exposed pipes carrying fluids 105°F and above.	Factory applied white fire retardant jacket, (ASJ), with butt strips stapled and banded. Pipes banded with not less than 3 bands per section.
Pipes carrying fluids 55°F and below up to 14 inches.	Factory applied white fire retardant jacket with self-sealing lap (ASJ) and butt strip. Ends of pipe insulation sealed off at valves, fittings and flanges with I.C. 301 or FB 30-35).

7 Vapor jacket permeability to be 0.02 perms.

8 Jacket Puncture Resistance to be 50 units (Beach).

B. Fittings, Valves and Flanges

1 Where manufactured, use factory pre-molded fittings (of the same material and thickness as the pipe insulation) for fittings, flanges and valves.

2 Where pre-molded insulation fittings are not manufactured, insulate fittings, flanges and valves with mitered segments of the same density as the adjoining pipe covering.

C. Elastomeric Insulation

1 Flexible elastomeric insulation: K=0.28 at 75 ° F mean temperature, 6 PCF density, 0.20 perm-in. maximum, water absorption one percent volume, ten percent weight. Armaflex/2000, with field applied UV protection for outdoor use.

2 Refrigerant vapor and hot gas bypass lines. Liquid lines inside the building must also be fully and separately insulated from gas lines.

2.2 DUCTWORK INSULATION

A. Glass Fiber Blanket

1 Glass fiber blanket insulation shall be insulated with 0.75 pcf (12 kg/m3) density, FSK-faced fibrous glass duct wrap insulation having a k-value of 0.27 kBtu•in/(h•ft2•°F) or better.

2 The duct wrap insulation shall consist of a blanket-type insulation composed of wool-type glass fibers firmly bonded with a thermosetting resin. Duct wrap material shall be factory-laminated to a scrim reinforced, foil-kraft (FSK) vapor retarder facing have a 2" stapling flange on one edge.

3 When installed in accordance with recommended installation procedures, duct wrap insulation shall provide installed R-values to meet 2010 NYC Energy Conservation Code.

B. Fiberglass Duct Board: Material to be high-density fiberglass duct board with foil kraft laminate facing, reinforced with scrim. Maximum thermal conductivity (K-value) at 75°F (24°C mean temperature to be 0.23 Btu – in/hr. – sq. ft. -°F (0.035 w/m - °C) when tested in accordance with ASTM C518 or ASTM C177.

C. Application

Service	Material	Insulation Thickness (inches)
Heated or Cooled Supply Air Ducts, concealed in unconditioned spaces, including shafts and hung ceilings	Glass Fiber Blanket	2 inch R=6 minimum
Heated or Cooled Supply Air Ducts, in	Glass Fiber	2 inch

Service	Material	Insulation Thickness (inches)
hung ceilings used as Return Air Plenums	Blanket	R=6 minimum
Heated or Cooled Supply Air Ducts exposed in unheated /unconditioned space	Glass Fiber Blanket	2-1/2 inch R=8 minimum
Return & Relief Air Ducts from heated or cooled spaces in unconditioned spaces including shafts and hung ceilings	Glass Fiber Rigid Board	2-1/2 inch R=8 minimum
Exhaust or Relief Air Ducts from automatic louvered damper to discharge at exterior openings	Glass Fiber Blanket	2-1/2 inch R=8 minimum

D. Rigid Glass Fiber Board to be six (6) pound per cu. ft. density with factory applied white fire retardant jacket (ASJ). Apply with mechanical fasteners. Seal joints and breaks.

E. Ventilating systems (which is neither heated nor cooled) supply ducts need not be insulated.

2.3 EQUIPMENT INSULATION

A. Hot Equipment: Glass fiber board, 6 pounds per cu. ft. density or calcium silicate block. Finish with 1/2 inch thick cement over copper clad hexagonal wire.

B. Cold Equipment: Glass fiber vaporseal board, 6 pounds per cu. ft. density faced with FRK jacket. Finish with 1/2 inch thick cement over vaporseal mastic and copper clad hexagonal wire.

2.4 ACCEPTABLE MANUFACTURERS

A. Insulation

1 Owens-Corning Fiberglass

2 Johns-Manville

3 Armstrong

4 Certain-Teed

5 Knauf

6 3M

B. Adhesives and Sealers

1 Benjamin Foster (H.B. Fuller Co.)

2 Rubatex

3 Minnesota Mining and Mfg. Co. (3M)

4 3M

PART 3 - EXECUTION

3.1 INSTALLATION OF INSULATION - GENERAL

A. Perform work in strict accordance with the manufacturer's recommendation and the best practice of the trade and the intent of this specification.

B. Apply insulation over clean dry surface, butting sections or surfaces firmly together and finishing as specified.

C. Seal vapor barriers in a continuous manner throughout against moisture penetration.

D. Insulation to be continuous through wall, floor and ceiling openings or sleeves. Do not cover any nameplates or identification tags.

3.2 INSULATION OF DUCT WORK AND FITTINGS

A. Before applying duct wrap, steel metal ducts shall be clean, dry, and tightly sealed at all joints and seams.

B. All portions of duct designated to receive duct wrap shall be completely covered with duct wrap.

C. To ensure installed thermal performance, duct wrap shall be cut to "stretch-out" dimensions as follows (P = perimeter of duct in inches/mm):

Labeled Thickness	Average Installed Thkns.	Thickness Calculation To Arrive at Correct Installed Thickness		
		Round Duct	Square Duct	Rectangular Duct
1-1/2"	1.125	P+9.5"	P+ 8.0"	P+ 7.0"
2"	1.5"	P+12.0"	P+ 10.0"	P+ 8.0"

D. A 2" (51 mm) piece of insulation shall be removed from the facing at the end of the piece of insulation to form an overlapping stapling and taping flap.

E. Install duct wrap insulation with facing outside so that the stapling flap overlaps the insulation and facing at the other end of the piece of duct wrap. Adjacent sections of duct wrap insulation shall be tightly butted, with the 2" (51 mm) stapling and taping flap overlapping. If ducts are rectangular or square, install so insulation is not excessively compressed at corners. Seams shall be stapled approximately 6" (152 mm) on center, with ½" (13 mm) minimum, steel, outward-clinching, staples.

F. Where a vapor barrier is required, seams shall be sealed with pressure-sensitive tape matching the insulation facing, either plain foil or fil-scrim-kraft (FSK). Seal all tears, punctures, and other penetrations of the duct wrap facing with tape or mastic to provide a vapor-tight system.

G. Wherever external duct insulation is specified and internal acoustic treatment of equivalent insulating effect is also required (by Drawings or Specifications) for the same location, the external insulation may be omitted.

H. Cover ductwork exposed to the outdoors with an additional 2-inch thickness of rigid glass fiber board 6 lbs./cu.ft., faced with factory applied all-service jacket, Johns-Manville Type 817 Spin-glas AP, or as approved.

I. Apply vaporseal board by mechanical fasteners such as Graham pins and speed washers. Seal joints with an adhesive, as approved and reinforced with a glass cloth membrane over vinyl mastic, or self-sealing matching tape. Butter pinheads with an adhesive, as approved. If vaporseal board is wired, use tin edges to protect the corners of the board. Seal edges and joints.

J. Enclose removable heads for equipment, (such as coolers, heat exchangers and horizontally split pumps) in aluminum sheetmetal boxes for easy removal with fiberglass board applied to inside of sheetmetal boxes of thickness as described above. Provide lifting handles for removal of boxes.

K. Install equipment insulation furnished loose by the equipment manufacturer in accordance with manufacturer's instructions.

3.3 INSPECTION

A. Upon completion of installation of duct wrap and before system operation is to commence, visually inspect the system and verify that duct insulation has been correctly installed.

B. Open all system dampers and turn on fans to purge all scraps and other loose pieces of material from the duct system. Allow for a means of removal of such material from the duct system.

C. Check the duct system to ensure that there are no air leaks through duct joints.

3.4 PIPING INSULATION

A. Fill surface imperfections such as chipped edges, small joints or cracks and voids or holes with insulation material and smooth all such areas with a skim coat of insulating cement.

B. No insulation must be installed at fittings and joints until the piping systems have been hydrostatically tested as specified elsewhere to the satisfaction of the Engineer.

C. Provide insulation for removable flanges of pipe strainers on cold services with built-up sections of glass fiber pipe covering, arranged to facilitate servicing of the strainer. Complete applications with vaporseals. Vapor barriers to be sealed and continuous through hangers, walls, sleeves, etc. Adhesives and coatings to be as noted herein.

D. Insulate fittings, flanges, valves, etc. for services where calcium silicate insulation is specified with mineral wool cement of equal thickness to the pipe insulation and finished with glass cloth.

E. Piping Exposed to Outdoors and Pipes Subject to Freezing: Cover piping with an additional layer of 2 inches glass fiber insulation of the same finish as specified for the particular service in paragraph 2.1, but not less than 3 inches total thickness. All piping subject to freezing will be insulated with a minimum of 2" fiberglass.

F. Insulate heat-traced piping as specified for piping exposed to outdoors. Cover with an aluminum jacket, as specified for piping exposed to the outdoors.

3.5 INSPECTION

A. Upon completion of installation of duct wrap and before system operation is to commence, visually inspect the system and verify that duct insulation has been correctly installed.

B. Open all system dampers and turn on fans to purge all scraps and other loose pieces of material from the duct system. Allow for a means of removal of such material from the duct system.

C. Check the duct system to ensure that there are no air leaks through duct joints.

D. Notify Mechanical Contractor of any leaks in pipe or joints. Do not insulate until leaks have been repaired.

E. Apply prefabricated sectional insulation for straight pipes neatly fitted around the piping, and sealed with adhesive. Apply adhesive to only one side of each joint and not to pipe surface.

F. Seal all joints with Foster 30-35 fire resistant vapor barrier mastic. Where required, oversized pipe sections or board type insulation may be used to fabricate and install insulation around pipe specialties. All void space must be firmly filled with flexible insulation to support oversized pipe insulation.

G. Secure sectional insulation with 0.02" thick by ½" wide aluminum bands manufactured by Childers, or Thomas & Betts "TY-RAP" nylon ties, on 24" centers for pipe sizes 2" and larger. Install at least two (2) bands per section of insulation.

H. Insulate cold water ball valves with 3/4" thick flexible elastomeric sheet insulation (ASTM C534) or approved equal as detailed on the Drawings. Finish insulation with two (2) coats of Rubatex 374 coating.

I. Insulate cold water vertical riser support clamps.

J. Insulate and thoroughly vapor seal control valve bodies where the valve actuator penetrates the insulation.

K. Replace any self-sealing insulation and/or lap that is found to be not sealing properly. Do not use staples to secure the insulation, lap, or coverings.

3.6 FINISHING OF INSULATION

A. Finish hot service pipe fittings and valve applications with open weave glass mesh adhered with I.C. 501 (or BF 30-35). Vaporseal for cold applications with I.C. 501 (or BF 30-35) adhesive with open weave glass mesh laid in while wet with final coat with I.C. 501 (or BF 30-35) adhesive. Overlap glass mesh and outer coat adjacent covering by at least 2 inches. Do not insulate flanges until systems are operational.

3.7 PROTECTION OF INSULATION

A. Protect pipe covering at hangers, guides, and roller supports with 16 gauge galvanized

metal shields or saddles (at least 3 times the insulation diameter in length and 1/3 the insulation circumference in width) on the outside of the insulation and vapor barrier. Hold shields in place with straps. Do not pierce the insulation with hangers. Where glass fiber insulation is used on piping 3 inches and larger, provide half-section of calcium silicate covering of equal thickness at metal shields.

B. Piping Exposed to Outdoors: Cover insulated piping exposed to outdoors or called for to be weatherproofed, in addition to finishes specified, with an aluminum jacket similar to Manville "Metal-Lok" or as approved, including all fittings.

END OF SECTION

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SECTION 230800

COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

B. The OPR and BOD documentation are included by reference for information only.

C. Division 01 section 'LEED Requirements' for additional LEED requirements.

1.2 SUMMARY

A. This section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DESCRIPTION

A. Refer to Division 01 Section "General Commissioning Requirements" for the description of commissioning.

1.4 DEFINITIONS

A. Refer to Division 01 Section "General Commissioning Requirements" for definitions.

1.5 SUBMITTALS

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's role.

B. Refer to Division 01 Section "Submittals" for specific requirements. In addition, provide the following:

C. Certificates of readiness

D. Certificates of completion of installation, prestart, and startup activities.

E. O&M manuals

F. Test reports

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the mechanical contractor of Division 23 shall ultimately be responsible for all standard testing equipment for the HVAC&R system and controls system in Division 23, except for equipment specific to and used by TAB in their commissioning responsibilities. A sufficient quantity of two-way radios shall be provided by each subcontractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.

D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the City of New York.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the installing contractors, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems

B. **Red-lined Drawings:** The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. **Operation and Maintenance Data:** Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been mad by the Contractor.

D. **Demonstration and Training:** Contractor will provide demonstration and training as required by the specifications. A complete training plan and schedule must be submitted by the contractor to the CxA four weeks (4) prior to any training. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.

B. Attend construction phase controls coordination meetings.

C. Attend testing, adjusting, and balancing review and coordination meetings.

D. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.

G. Prepare preliminary schedule for Mechanical system orientations and inspections, operation and maintenance manual submissions, training sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for the Commissioner. Distribute preliminary schedule to commissioning team members.

H. Update schedule as required throughout the construction period.

I. Assist the CxA in all verification and functional performance tests.

J. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

K. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.

L. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

M. Notify the CxA a minimum of two weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.

N. Participate in, and schedule vendors and contractors to participate in the training sessions.

O. Provide written notification to the CM/GC and CxA Authority that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.
1. HVAC&R equipment including all fans, air handling units, ductwork, dampers, terminals, and all other equipment furnished under this Division.
2. Fire stopping in the fire rated construction, including fire and smoke damper installation, caulking, gasketing and sealing of smoke barriers.
3. Fire detection and smoke detection devices furnished under other divisions of the specification.

P. The equipment supplier shall document the performance of his equipment.

Q. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

R. Test, Adjust and Balance Contractor
1. Attend initial commissioning coordination meeting scheduled by the Commissioning Authority.
2. Submit the site specific testing and balancing plan to the CxA and Commissioner for review and acceptance.
3. Attend the testing and balancing review meeting scheduled by the CxA. Be prepared to discuss the procedures that shall be followed in testing, adjusting, and balancing the HVAC&R system.
4. At the completion of the testing and balancing work, and the submittal of the final testing and balancing report, notify the HVAC&R contractor and the CM/GC.
5. At the completion of testing and balancing work, and the submittal of the final testing and balancing report, notify the HVAC&R Contractor and the CM/GC.
6. Participate in verification of the testing and balancing report, which will consist of repeating measurements contained in the testing and balancing reports. Assist in diagnostic purposes when directed.

S. Equipment Suppliers
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Commissioner, to keep warranties in force.
2. Assist in equipment testing per agreements with contractors.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

T. Refer to Division 01 Section "General Commissioning Requirements" for additional contractor responsibilities.

3.3 COMMISSIONER'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Commissioner's Responsibilities.

3.4 DESIGN PROFESSIONAL'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Design Professional's Responsibilities.

3.5 CxA'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's Responsibilities.

3.6 TESTING PREPARATION

A. Certify in writing to the CxA that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.7 TESTING, ADJUSTING AND BALANCING VERIFICATION

A. Prior to performance of Testing, Adjusting and Balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Notify the CxA at least ten (10) days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.

1. The CxA will notify testing and balancing subcontractor ten (10) days in advance of the date of field verification. Notice will not include data points to be verified.
2. The testing and balancing subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.8 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the HVAC&R contractor, testing and balancing Subcontractor, and HVAC&R Instrumentation and Control Subcontractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.9 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. **Equipment Testing and Acceptance Procedures**: Testing requirements are specified in individual Division 23 sections. Provide submittals, test data, inspector record, and certifications to the CxA.

B. **HVAC&R Instrumentation and Control System Testing:** Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.

C. **Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment:** Test requirements are specified in Division 23 piping Sections. HVAC&R Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
3. Minimum flushing water velocity.
4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. **Refrigeration System Testing:** Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. **HVAC&R Distribution System Testing**: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

F. **Vibration and Sound Tests:** Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

G. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:

1. Air Cooled VRV Condensing Units
2. AC Units (Air VRV Terminals)
3. Building Automation System
4. Cabinet Unit Heaters
5. Ductwork
6. DX Reheat Coils
7. Electric Duct Heaters
8. Energy Recovery Units
9. Exhaust Fans
10. Fans
11. Piping
12. Roof Top Units
13. Smoke Purge Fan
14. Testing, Adjusting and Balancing

3.10 DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.

3.11 APPROVAL

A. Refer to Division 01 Section "General Commissioning Requirements" for approval procedures.

3.12 DEFERRED TESTING

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deferred testing.

3.13 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.

B. Refer to Division 01 Section "General Commissioning Requirements" for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.14 TRAINING OF NEW YORK CITY PERSONNEL

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to training.

END OF SECTION 230800

SECTION 232300

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes removal of existing refrigerant containing equipment, refrigerant recovery and refrigerant piping used for air-conditioning applications.

1.2 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-410 A:
   1. Suction Lines for Heat-Pump Applications: 325 psig
   2. Hot-Gas and Liquid Lines: 325 psig

B. All work shall be performed in compliance with provisions of section 608 of 1990 US Clean Air Act and Title CFR 40, Part 82,Subpart F. and in accordance with New York City Fire Code and all other applicable NY state and Federal regulation.

1.3 BEST MANAGEMENT PRACTICES

A. The following BMPs are recommended for management and recycle of refrigerant/CFCs:
   1. Use only EPA approved refrigerant handling machines when recharging or removing refrigerants.
   2. Sell refrigerant to certified technicians or to certified reclamation facilities that will reclaim the refrigerant to its original purity specifications.
   3. Dispose of filters from CFC recapture as hazardous waste.
   4. Keep accurate records for at least 3 years.

1.4 QUALITY ASSURANCE

A. A.Materials shall conform to the latest edition of reference specifications and industry standards specified herein and applicable, and to pertinent codes and requirements of local authorities having jurisdiction.
   1. Certify brazing procedures, brazers, and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and jobsite brazing of piping work.

B. Manufacturer's Qualifications: Firms regularly engaged in manufacture of pipes and pipe fittings of types and sizes required, whose products have been in satisfactory use in similar service for not less than 3 years.

1.5 SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop based on manufacturer's test data.

B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

C. Technician Certification: Submit qualification for refrigerant technician in accordance with requirements of Title 40 CFR. Part 82, Subpart F, Article 82.161. The technician shall have current Universal certification for servicing all types of equipment.

D. Equipment Certification: Submit certification for refrigerant recovery equipment in accordance with requirements of Title 40 CFR. Part 82, Subpart F, Article 82.162.

E. Field quality-control test reports.

F. Operation and maintenance data.

1.6 QUALITY ASSURANCE

A. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

B. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.7 PRODUCT STORAGE AND HANDLING

A. Provide factory-applied plastic end caps on each length of pipe and tube. Maintain end caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube.

B. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: **ASTM B 280, Type ACR.**

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

E. Brazing Filler Metals: AWS A5.8.

F. Flexible Connectors:

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
4. Pressure Rating: Factory test at minimum 500 psig
5. Maximum Operating Temperature: 250 deg F

2.2 REFRIGERANTS

A. Manufacturers: Furnished by refrigerant manufacturer.

B. Refrigerant: R-410 A

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with **brazed** joints.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping in neat manner using channel with pie clamp and elastomeric cushion. Provide removable jacketing indoors over exposed refrigerant piping

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Install piping adjacent to machines to allow service and maintenance.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

M. Install refrigerant piping in protective conduit where installed belowground.

N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

O. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

P. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

Q. Install pipe sleeves at penetrations in exterior walls and floor assemblies.

R. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping."

S. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

T. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.

U. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.

3.3 PIPE JOINT CONSTRUCTION

A. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.

3.4 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

B. Install the following pipe attachments:
   1. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
   1. NPS 5/8 : Maximum span, 60 inches; minimum rod size, 1/4 inch .
   2. NPS 1 : Maximum span, 72 inches minimum rod size, 1/4 inch.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

   1. Comply with ASME B31.5, Chapter VI.
   2. Test refrigerant piping and specialties. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
   3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.

      a. Fill system with nitrogen to the required test pressure.
      b. System shall maintain test pressure at the manifold gage throughout duration of test.
      c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
      d. Remake leaking joints using new materials and retest until satisfactory results are achieved.

3.6 SYSTEM CHARGING

A. Charge system using the following procedures:

   1. Install core in filter dryers after leak test but before evacuation.
   2. Evacuate entire refrigerant system with a vacuum pump to 500 microns Hg. If vacuum holds for 12 hours at ambient temperatures of 60°F , system is ready for charging.
   3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
   4. Charge system with a new filter-dryer core in charging line.

3.7 REFRIGERANT HANDLING

A. Contractor shall follow provisions outlined in section 608 of the 1990 US Clean Air Act and Title 40 CFR, Part 82, Subpart F for safe handling and disposal of Class I and Class II refrigerants to include but not limited to:

1. Refrigerant technician certification
2. Refrigerant recovery equipment certification
3. Appliance or equipment evacuation vacuum levels
4. Hazardous materials manifest reporting and record keeping.
5. Safe disposal of refrigerants

B. In event of accidental release of refrigerant the contractor shall follow the procedures for reporting release of hazardous materials in accordance with NYC Fire Code, section 606.13, other applicable NY State and Federal Regulations.

3.8 ADJUSTING

A. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
1. Verify that compressor oil level is correct.
2. Open compressor suction and discharge valves.
3. Open refrigerant valves except bypass valves that are used for other purposes.

3.9 REPORTING

A. Contractor shall prepare a Certificate of Test in accordance with New York City Mechanical Code, Section 1108.4

END OF SECTION

SECTION 233000

DUCTWORK AND ACCESSORIES

PART 1- GENERAL

1.01 SUMMARY

A. This section specifies administrative and procedure requirements regarding mechanical work. Additional requirements are specified in various sections of Division 23 and also may be required during the execution of work due to project conditions.

B. Air distribution systems have been designed for optimum performance. Any subsequent alterations to the design must be accompanied by a computer analysis or hand calculations showing that the proposed alterations will still provide the original design volume without increasing the system total pressure. Any unavoidable field changes to the original design (offsets for interferences, etc.) must be reported to the Owner's Representative so that accurate "as-built" operating parameters may be established.

C. Air Distribution Systems shall be substantially built with joints and seams smooth on the inside and a neat appearance on the outside. Flanges at joints and for reinforcement shall not project into the airstream. Welds shall be given a protective coating of anti-corrosive primer; welds in galvanized metal shall be given a coat of ZRC Products Co. Cold Galvanizing compound or approved equal by Fastenal, Crown, Sprayon or equal. Provide reinforcing to prevent buckling, breathing, vibration, and unnecessary noise. Provide any additional reinforcing to that specified or shown to meet these requirements and job conditions.

D. Materials, accessories, and construction shall comply with the applicable requirements of NFPA 90A. Sealants and tapes shall be` Underwriters Laboratories, Inc. (UL) classified. Where specific details are not shown on the Drawings or specified herein, they shall be based on the recommendations of the latest issue of the ASHRAE Guide and/or applicable SMACNA Duct Construction Standards consistent with the quality of the construction.

E. Each Air Distribution System shall be constructed, assembled and sealed to achieve or exceed the Leak Class specified in the Construction Specifications.

F. Air Distribution Systems located outdoors shall be constructed water tight. All seams and joints shall be continuously sealed. Seams and joints in galvanized and stainless steel sheet metal shall be caulked, brazed or soldered. Spiral seams in spiral ductwork of all materials shall be caulked. Seams and joints in black steel shall be welded. Transverse connections shall be companion angle or flanged type assembled with soft neoprene gasketing or modified butyl rubber caulk tape Hardcast 1902-FR or equal, completely caulked and sealed. Caulking shall be accomplished by use of high velocity duct sealant that is impervious to water.

G. All sizes indicated on the Drawings are sheet metal sizes.

H. Work under this Section of the Specifications shall also include the following:

1. Review and approval of sizes of all air measuring devices, automatic control dampers and smoke dampers during the processing of shop drawings.

2. Installation of all air measuring devices, automatic control dampers and smoke dampers furnished under other sections of these Specifications.

3. Repair and adjustments for proper operation and closure of blade action of automatic control dampers and smoke dampers that may be necessary as a result of bending, distortion or damage during or following installation.

4. Cooperate with the Control Contractor on the processing of shop drawings for air measuring devices, automatic control dampers and smoke dampers and for any repairs or adjustments to automatic control dampers and smoke dampers that may be necessary after installation.

5. Mounting (in air handling systems) smoke detectors furnished and wired under other Divisions of the Specifications, Refer to Article, Smoke Detection in Part 3 - Execution

I. Access doors and/or access sections with access doors shall be provided as follows:

1. Where specified elsewhere in these Specifications, where shown on Drawings, and where required for component access.

1.02 SUBMITTALS

A. Prepare and submit for approval shop drawings showing layouts of air distribution systems. Layout drawings shall be drawn to a scale of 3/8" = 1'-0". Layouts shall be coordinated with the building structure and the work of other trades to eliminate conflicts with Air Distribution Systems during installation. Locate ceiling mounted devices of Air Distribution Systems to avoid conflict with ceiling structure system and other ceiling mounted items such as lighting fixtures, speakers, sprinkler heads, smoke detectors, etc. that will be installed under other Divisions of the Specifications; follow approved reflected ceiling plans when such plans are part of the contract documents or will be furnished as a requirement of the contract documents. Also include:

1. Dimensions of actual equipment used.

2. Adequate sections, elevations, and plan views.

3. Dampers and other required accessories.

4. Elevation above floor and ceiling height for each room.

5. Air balance test plug locations.

B. LEED Submittals:

1. Product Data for Prerequisite EQ 1: Documentation indicating that duct systems comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."

2. Product Data for Prerequisite EA 2: Documentation indicating that duct systems comply with ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

3. Leakage Test Report for Prerequisite EA 2: Documentation of work performed for compliance with ASHRAE/IESNA 90.1-2004, Section 6.4.4.2.2 - "Duct Leakage Tests."

4. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.

C. Shop Drawings shall also include each item of equipment or material provided. This shall include, but not be limited to, the following:

1. Air extractor
2. Turning vanes
3. Duct sealants
4. Sleeve Layout Drawings as specified in Article, Duct Sleeves.
5. Sample of flexible ductwork.
6. Other specific items as specified under Part 2 - Products and as requested.
7. Fire and smoke dampers and schedule of sizes and location.
8. Notify Owner of any deviations from Contract Plan and Specifications.
9. Obtain each Contractor's approval, in writing, correct accordingly.
10. Correct Drawings, furnish copies as follows: One (1) copy: Contractor for each major trade; Two (2) copies: Owner.
11. Provide roof, wall and floor opening dimensions and locations for General Contractor.

D. Refer to "General Provisions" for additional requirements regarding shop drawings.

1.03 QUALITY ASSURANCE

A. Fabricate and install all Air Distribution Systems in compliance with latest issue of each of the following:

1. SMACNA and other Standards referenced in this specification.
2. NFPA Standards, Bulletin 90A and 101.
3. Plans and Specifications that may be in excess of items #1 and #2 above.

B. Sheet metal to be fabricated and installed by an approved Contractor specializing in this type of Work.

C. All fire and smoke dampers must be UL labeled.

1.04 PRESSURE VELOCITY CLASSIFICATION

A. Classify as Specified in the Material and Construction Specifications Following Herein.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT, GENERAL

A. All gauges and weights shall be per SMACNA. All materials must be new premium quality lock forming; marked with manufacturer's name and must comply with applicable ASTM and ANSI Standards. All ducts shall be constructed to SMACNA seal Class A.

B. Construction shall also conform to the following supplemental and specific requirements for systems up to and including 2" WG:

1. Transitions shall be made with maximum angle of 15 degrees from straight duct for diverging flow, twenty (20) degrees for contracting flow.
2. Opposed blade volume dampers must be provided in every branch duct.
3. Exhaust duct branch connections shall be made at forty-five (45) degrees.
4. Grille connections to duct shall be made with radiused or boot type tap-in unless shown otherwise on Drawings.
5. Similar materials shall be used within a given unit of ductwork including joints and bracing angles, hangers, bolts, rivets, and other fabrication materials.
6. Joints between dissimilar metal in ductwork shall be made with fiber gaskets. Bolts shall be protected by fiber ferrules sleeves and washers so there will be no contact between the metals.
7. Make ducts and plenums watertight where there is danger of water leakage.
8. Gas Tight Duct - All ducts carrying offensive odors shall be made gas tight to satisfaction of Owner.
9. Tape all return and supply duct joints with Hardcast AFT-701.

C. Material Schedule

Ductwork System / Service	Material
Shower and toilet exhaust.	Aluminum
All others	Galvanized

2.02 DUCTWORK MATERIAL SPECIFICATIONS SHALL BE AS FOLLOWS

A. HVAC Supply and Return Material Specification

1. General: Hot dipped galvanized sheet steel, lock forming quality, zinc coating designation G90, ASTM A527. Reinforcements (structural shapes) shall be of galvanized steel.

B. High Moisture Content Exhaust Material Specification

1. General: Aluminum sheets shall be of aluminum alloy 3003-H14, lock forming quality, ASTM B209. Reinforcements (structural shapes) shall be of aluminum alloy 6061-T6, ASTM B221.

C. Insulated Flexible Ductwork Material Specification

1. General
   a. Flexible round duct of fully annealed aluminum, corrugated for strength and flexibility and suitable for positive and negative 10" w.g. working pressure at 200 degrees F. Duct shall include 1" thick fiberglass external insulation having a maximum thermal conductivity of 0.23 at 75 deg. F mean and be enclosed in a vinyl vapor barrier jacket. Ductwork shall comply with NFPA 90A and be Underwriters Laboratories, Inc. (UL) listed Class 1 Air Duct, UL Standard 181.
   b. Flexible duct for diffuser and terminal connections shall be helically wound wire reinforced PVC inner liner with 2" thick fiberglass insulation and PVC

outer jacket Thermaflex-MK or equal.

2.03 DUCTWORK CONSTRUCTION

A. Ductwork construction shall conform to the following operating classifications.

B. Ductwork Construction Specification - operating pressure up to 2" WG (between terminal device and volume control box, systems without volume control boxes, or as noted).

1. General

a. Except where specified otherwise, construction for round and rectangular styles shall be in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible - First Edition dated 1985.

b. Pressure-velocity classification shall be for static pressure to +2 w.g. positive and negative velocity to 2500 fpm, and a Seal Class of A or better as required to achieve a Leakage Class of 6 for rectangular ductwork and a Leakage Class of 3 for round ductwork.

2. Ductwork

a. Do not use cross breaking or beading where diffusers, registers, and grilles are mounted directly on ductwork. Do not use internal type standing seams which project into ductwork.

b. Round ductwork shall have grooved seams, Fig. 3-1, Type RL-5. Transverse joints shall be beaded sleeve type assembled with sealant and screws, Fig. 3-2, Type RT-1.

c. Sealant types shall be as specified in Article, SEALANTS in this Section of the Specifications.

d. At companion angle and flanged transverse joints, use Ductmate Industries Inc. Type 440 synthetic polymer (butyl) based gasket/sealing tape or approved equal.

3. Elbows

a. Radius elbows in rectangular ductwork shall be standard radius (1.5 R) type, Fig 2-2, Type RE-1. If short radius elbows are required, provide splitter vanes in elbows, Figs. 2-5 and 2-6.

b. Square elbows in rectangular ductwork shall have double thickness turning vanes, Figs 2-3 and 2-4. For ducts up to 18" wide use small vanes having 2" inside radius. For larger ducts use large vanes having 4-1/2" inside radius. Approved factory fabricated vanes and runners such as Tuttle and Bailey Duct turn may be used. Runners for vanes in lined ductwork shall be same height as liner thickness.

c. Elbows in round ductwork may be either die-stamped with continuously welded seams, or welded miter type consisting of not less than 5 gores for 90 degree elbows and not less than 3 gores for 45 degree elbows.

4. Branch Connections: Construct branch duct connections per SMACNA for

pressures up to 2" WG.

2.04 DUCT HANGERS AND SUPPORTS

A. Provide hangers and supports for ductwork.

B. Furnish and erect all auxiliary structural steel, not a part of building structure, required for support of ductwork. All such steel shall conform to ASTM A36.

C. Upper attachments for structural steel shall be beam clamps with lock nuts and retaining straps. Loads imposed shall not exceed manufacturer's recommended maximum load

D. Hangers and supports for ductwork exposed to view shall be of same materials as the ductwork except hangers and supports for plastic ductwork shall be of galvanized steel. Concealed hangers and supports may be of black or galvanized steel except hangers and supports for aluminum ductwork shall be of aluminum.

E. Hangers and supporting systems shall be in accordance with the applicable SMACNA Duct Construction Standards specified further herein with the following exceptions:

1. No hangers shall be attached to or suspended from any type of metal deck. However, where structural concrete slabs occur on metal decks, attachments may be made through the metal deck into structural concrete slabs where approved by Owner. Attachments beneath metal deck areas may be made by fastening to building structural members (excluding bridging and bracing) in conjunction with the use of miscellaneous auxiliary structural steel.

2. Whenever the distance between the top of the ductwork and the overhead supporting member is greater than 30", the hangers shall be structural angles or channels and shall include cross bracing as required to prevent sway. Do not use straps or rods.

3. Where shown or noted otherwise on Drawings.

F. Hangers and supports shall be in accordance with SMACNA HVAC Duct Construction Standards - Latest Edition, except that hanger fasteners shall not pierce the ductwork.

G. Hangers must be arranged to allow the duct insulation to pass without insulating any part of the hanger.

2.05 DUCT SLEEVES

A. Refer to notes and/or details on Drawings.

B. Sleeves shall be 22 gauge galvanized steel unless shown or specified otherwise.

C. Sleeve requirements for fire dampers shall be as directed by the fire damper manufacturer. Refer to Article, FIRE DAMPERS in this Section of the Specifications.

2.06 SEALANTS

A. Generally, sealants for Air Distribution Systems shall be of the liquid and/or mastic type applied without the use of tapes except where specifically permitted in the Specifications. In case of conflict the more stringent sealing requirements shall be used.

B. Except where noted otherwise, sealants specified herein shall be suitable for use with galvanized steel, aluminum and stainless steel.

C. All sealants for Air Distribution Systems, unless otherwise specified herein, shall be Underwriters Laboratories Classified and meet NFPA 90A, Class 1 requirements when applied in a manner consistent with its intended use. Ratings shall not exceed a Flame Spread of 25 or a Smoke Developed of 50. All containers and/or their shipping cartons shall bear an Underwriters label indicating flame and smoke ratings and shall include the product's Fire Hazard Classification. Labeling shall also include Hazard Statement as required by the Consumers Products Safety Act, CFR Title 16, Chapter II, Subchapter C, Federal Hazardous Substances Act Regulations, Part 1500, Section 1-272.

D. Sealants for Air Distribution Systems shall be compatible with the materials, application and operating temperatures of the system. Sealants used for systems handling fumes and chemicals shall be confirmed suitable for the specific application. Sealants exposed to the weather shall be ultraviolet light and ozone resistant and provide a water tight seal. Generally systems of welded construction including thermowelded, solvent welded or chemically bonded construction do not require sealants. Sealants shall be applied in accordance with the manufacturer's instructions. Provide adequate ventilation and follow safety procedures as required. Adequate drying/curing time shall be allowed before operating or testing the systems.

E. Sealants designated "assembly sealants" shall be suitable for use to fabricate and assemble systems. Sealants designated "exterior duct sealants" shall be suitable for exterior application and sealing of Air Distribution Systems after assembly. "Exterior duct sealants" applied over "sealants" must be compatible with each other.

F. Except where shown or specified otherwise, applications and products shall be as follows:

1. Assembly sealants for systems indoors that handle environmental air

   a. United Duct Sealer

   b. United Uni-Grip

   c. United Uni-Weather

   d. Foster 30-02

   e. Precision Adhesive, Inc. PA-2084

   f. Hardcast Iron Grip

2. Assembly sealants and exterior duct sealants for systems outdoors that handle environmental air, fumes and chemicals:

   a. United Uni-Weather

   b. Hardcast Iron grip

G. Products and their applied operational temperature ranges (in degrees F in parenthesis) shall be as follows:

1. United Duct Sealer (-20 to +150) as manufactured by United McGill orp.
2. United Uni-Grip (-25 to +200) as manufactured by United McGill Corp.
3. United Uni-Weather (-20 to +300) as manufactured by United McGill Corp.
4. PA-2084 Duct Sealant (-20 to +250) as manufactured by Precision Adhesives, Inc.
5. No. RTV-102 Silicone Sealant (-75 to +400) FDA approved as manufactured by General Electric Co.

H. Provide other sealants, adhesives and tapes as specified elsewhere in this Section of the Specifications.

I. Except for silicone type sealants, equivalent products of other manufacturers will be accepted subject to shop drawing review and approval of the proposed manufacturer's product data. No other manufacturer will be accepted for the silicone sealants specified.

2.07 DUCT FIRESTOPPING

A. General

1. Provide fire-stopping for air ducts/sleeves that penetrate floors, walls and other partitions of building construction that are required to have a fire resistive rating but do not require the installation of fire dampers.
2. Fire-stopping shall be accomplished by using a combination of materials as specified herein to makeup a complete fire-stop.
3. Acceptable fire-stopping materials and procedures shall be UL classified and designed to maintain seal under normal expected movement at penetrations.
4. Comply with the arrangements and requirements shown in the details and notes on the Drawings generally and specifically, the requirements specified herein.
5. The installed fire-stopping systems shall meet the approval of the authorities that have jurisdiction.

B. Manufacturer

1. Acceptable manufacturer is as follows:
   a. USG Interiors, Inc.

C. Materials

1. Fire-stopping shall consist of the following materials:
   a. Thermafiber Mineral Fireproofing Board, 9 pcf, foil faced
   b. Thermafiber Smoke Seal Caulking Compound.

D. Fire Tests

1. Provide fire-stopping materials that have been tested in accordance with the following:
   a. ASTM E814 - Methods for Fire Tests of Through-Penetration Firestops.

b. UL 1479 - Fire Tests of Through-Penetration Firestops.

E. Fire-stop Classification References: Fire-stop materials shall be listed in UL Fire Resistance Directory, latest edition.

F. Sleeves

1. Refer to details shown on Drawings.

2. Refer to requirements for sleeves in this Section of the Specifications.

G. Refer to the Article, FIRE DAMPERS in this Section of the Specifications for requirements on air ducts penetrating floors, walls and other partitions of building construction that have a fire resistive rating and require the installation of fire dampers.

2.08 DUCT SAFING

A. Provide safing for air distribution systems as shown on Drawings.

B. Safing in air streams of air distribution systems shall be as follows:

1. Minimum 22 gauge unless shown otherwise on Drawings or a heavier gauge is required by the dictates of the related Ductwork Material Specification and/or Ductwork Construction Specifications.

2. Material type shall match related system unless shown or specified otherwise.

C. Safing not in air streams of air distribution systems shall be as follows:

1. Minimum 22 gauge galvanized steel shall be used for all safing unless shown or specified otherwise.

2. Safing exposed in finished areas for uninsulated stainless steel, aluminum and plastic coated galvanized steel air distribution system ductwork shall be 22 gauge (unless shown or specified otherwise) and match material type of related air distribution system.

2.09 AIR EXTRACTORS

A. Where shown on the Drawings, provide a multi-blade adjustable air extractor at branch duct and/or air outlet take-offs.

B. Extractor device shall be AVLR Vectrol or approved equivalent, constructed of same material as ductwork in which installed.

2.10 BRANCH DUCT TURNING VANES

A. Where shown on the Drawings, provide a multi-blade air turning device at branch duct take-offs.

B. Air turning device shall be Air Devices Inc. No. AOOF Deflectrol Airturn or approved equivalent, constructed of same material as ductwork in which installed.

2.11 MANUAL VOLUME CONTROL DAMPERS (HAND DAMPERS)

A. Where indicated on the Drawings, provide manual volume control dampers to balance air distribution.

B. Dampers in rectangular and round ductwork shall be as shown in SMACNA HVAC Duct Construction Standards Metal and Flexible - First Edition dated 1985, Figs. 2-14 and 2-15, subject to the following:

1. Dampers and frames shall be constructed of same material as ductwork in which they are installed.

2. Damper blades in rectangular ductwork shall be maximum 8" wide. Dampers having two or more blades shall be opposed action type with connecting bar and linkage. All multiblade dampers shall be mounted in frames.

3. Dampers shall be provided with all mounting hardware and include locking type quadrants and handle operators. Include extended shafts in lengths as required to accommodate externally insulated air distribution system ductwork. Damper hardware shall be manufactured by Duro-Dyne Co., Ventfabrics, Inc. or Young Regulator Co. Improvised shop or field fabricated hardware will not be accepted.

C. Access doors shall be provided at each volume control damper where indicated on Drawings.

2.12 REMOTE MANUAL DAMPER CONTROLLER - TYPE RDC

A. For all inaccessible ceilings provide remote manual balance damper to balance air distribution regardless of whether noted on plans

B. Assembly shall consist of opposed blade volume damper with full length axle and bearings at both ends od operating shaft, flexible metal covered stainless steel cable terminating in 1/8 inch (3.2 mm) hexagon socket head and necessary accessories to make a complete installation. Operator end arranged for flush concealed mounting.

C. Regulator shall be embedded in the finished ceiling or wall material so that the unit shall be flush with the finished ceiling or accessible from air inlet and outlet face. Cover plate shall not exceed 7/8 in. diameter.

D. Manufacturers: Young Regulator Company, Ventfabrics Inc, Pottorff (Div of PCI industries)

2.13 REMOTE POWER DAMPER CONTROLLER

A. The contractor has the option to provide remote power damper controller as an alternate to remote manual damper controller specified above.

B. For inaccessible ceilings provide remote power balance damper where noted on plans to balance air distribution

C. Provide United Enertech Power / Balancer Model i-3 with drive actuator. Drive actuator shall be DC voltage.

D. Damper shall be extruded galvanized frame, galvanized blade (formed aluminum single blade through 12 inch height), nylon 6/6 molded bearings, zinc plated steel pin axles.

E. The contractor shall furnish a terminal behind diffuser face / grille connected with plenum rated CAT5 cable from the damper to female outlet.

F. Balancing shall be achieved via a hand held power pack using RJ-11 connector.

G. Contractor shall turnover power pack to owner after balancing is complete

2.14 CONSTANT AIR REGULATORS

A. Where indicated on the Drawings, provide constant volume regulator to balance air distribution.

B. Model CAR Constant Airflow Regulators as manufactured by American ALDES Ventilation Corporation, Sarasota, Florida, or approved equivalent, shall solely operate on duct pressure and require no external power supply. Each regulator shall be preset and factory calibrated requiring no field adjustment to the airflows as indicated on the schedule, and shall be rated for use in air temperatures ranging from -25° to 140° F (-32° to 60° C.)

C. Constant airflow regulators shall be capable of maintaining constant airflow within +/- 10% of scheduled flow rates (15% for units 50 cfm or less), within the operating range of 0.2 to 0.8 in. w.g. differential pressure, or 0.6 to 2.4 in. w.g. on high-pressure models. Sound power levels shall not exceed those for each size and cfm rating as scheduled.

D. Regulators shall be provided as an assembly consisting of a flame resistant plastic body with self-inflating silicon element housed within a .75mm galvanized steel sleeve or flanged plate for mounting in either round or rectangular duct. Each round sleeve must be fitted with a brush gasket to assure perimeter air tightness with the interior surface of the duct.

E. All Constant Airflow Regulators will require no maintenance and must be warranted for a period of no less than five years. Constant Airflow Regulators shall be installed in tight ducting systems in accordance with all applicable codes and manufacturer's instructions.

2.15 BACK DRAFT DAMPERS

A. Damper frame and blades for Air Distribution Systems constructed of galvanized steel or aluminum shall be 14 gauge aluminum, all welded construction. Assemblies shall be suitable for pressure differentials up to 3" w.g. and velocities up to 2000 fpm.

B. Blades shall pivot, off center, on 1/2" diameter shaft in sintered bronze self-lubricating bearings. Edges shall have polyurethane seals.

C. Include linkage and hardware for a complete operating assembly and counter balance devices. For downward airflow, springs shall be included in addition to counter balancing devices.

D. Dampers shall be Louvers & Dampers, Inc. Model ABD-200. Equivalent approved products by American Warming and Ventilating Co. or Ruskin will be accepted.

2.16 FIRE DAMPERS

A. Fire dampers shall be provided where shown on the Drawings. Location and protection procedure must meet the requirements outlined in the latest edition of NFPA 90A and local NY City Building Code. All fire dampers shall be Underwriters Laboratories, Inc. (UL) tested, approved and labeled and meet the minimum characteristics outlined in NFPA 90A and be installed in strict accordance with manufacturing conditions of listing by UL.

B. The fire damper manufacturer shall furnish complete instructions on the installation procedures required by Underwriters Laboratories.

C. Manufacturer shall provide standard temperature fusible link and furnish one spare link for each fire damper.

D. Provide access door at each fire damper. Identify all fire damper access doors by stenciling with bright red paint the words "FIRE DAMPER ACCESS".

E. Fire dampers specified herein are Air Balance, Inc. Fire/Seal. Equivalent approved products of Advanced Air Corp. or Ruskin Mfg. Co. will be accepted.

F. Fire dampers for transfer air applications shall be model 119AF, rectangular shutter type, 1-5/8" wide, of galvanized steel construction for vertical mounting only.

G. Fire dampers for applications other than air transfer shall be shutter type suitable for either horizontal or vertical mounting as required. Dampers in ducts constructed of plastic, FRP and PVC coated steel shall be constructed entirely of Type 304 stainless steel. Otherwise, dampers shall be constructed of the same materials as the ductwork in which they are installed. Dampers for other than air transfer shall be as follows:

1. Model 119BL with only frame in air stream - for rectangular ducts constructed for 2" w.g. static pressure or less.
2. Model 119CL-RC with both frame and blades
3. Model 119CL-RD/OV with both frame and blades out of air stream, welded construction - for round and oval duct constructed to 10" w.g. static pressure.

2.17 ACCESS DOORS/PANELS

A. Provide access doors in ductwork as specified herein. Access panels where specified or indicated on Drawings shall be considered as access doors and provided in accordance with the following Specifications.

B. Provide access doors in ductwork at the following except when blades, linkages and related accessories are all directly accessible.

1. Backdraft dampers.
2. Automatic control dampers and smoke dampers.

C. Provide access doors in ductwork at the following:

1. Smoke detectors. When not accessible from access doors provided for smoke dampers.
2. Fire dampers and doors.
3. Combination fire/smoke dampers.
4. Volumetric control boxes, tracking boxes, etc.
5. Wherever else indicated on the Drawings or required by the Specifications.

D. Manufactured access doors are available in sizes from 6" x 6" to 24" x 24". When not sized on the Drawings, be guided by the following:

1. Access doors at backdraft dampers and automatic control and smoke dampers shall be large enough and so placed that damper blade position may be observed and also

permit operation of damper from within duct if necessary. These requirements also apply when access doors are required for access to volume control dampers.

2. Access doors at fire dampers, fire doors and combination fire/smoke dampers with fusible links shall be large enough and so placed that damper blades may be retracted and fusible link attached.

3. Access doors at reheat coils shall be large enough and so placed that both faces of coil may be cleaned.

4. Access doors at air measurement devices, shall be large enough and so placed that these devices may be checked.

E. Access doors for rectangular ductwork shall be as manufactured by Air Balance, Inc. Fire/Seal, double panel type as follows herein. Equivalent approved products of Advanced Air Corp., Buckley Air Products, Inc. or Anthem Metal Products will be accepted.

1. Model FSA100, hinged with camlatch or latches, 1" insulation - for insulated and noninsulated ductwork constructed for 2" w.g. static pressure or less.

F. Access doors for round ductwork shall be as manufactured by United McGill Corp., Greenheck or equal as follows:

1. Access doors in uninsulated negative pressure round ductwork shall be access sections with a rectangular hinged door having gasket and quick opening latches that opens against negative duct pressure, type ASH.

2.18 FLEXIBLE CONNECTORS

A. Connectors for ductwork systems constructed of galvanized sheet steel shall be factory assembled units consisting of 6" fabric attached to two galvanized steel connectors by double lock seams, Duro Dyne Corp. Super Metal-Fab or approved equal by Ventfabrics, Ward Industries. Where indoors, fabric shall be Duro Dyne Type Glasseal, or approved equal by Ventfabrics, Ward Industries, consisting of vinyl coated, waterproof fiberglass that is Underwriters Laboratories (UL) listed, complies with NFPA 90A and 90B, is suitable for service to +5 psig, +180 deg. F and is resistant to acids - chemical fumes, grease, oils, gasolines and alkalies. Where outdoors, fabric shall be Duro Dyne Type Durolon, or approved equal by Ventfabrics, Ward Industries, consisting of a polycarbonate-coated, heavy glass fabric that is UL listed, complies with NFPA 90A and 90B, is suitable for service to +5 psig, +300 deg. F and is resistant to ozone, weathering, fading, abrasion, oils, greases, acids and oxidizing chemicals. Connectors for galvanized steel systems may be fabricated by the Contractor using galvanized steel that is the same as that specified under the Ductwork Material Specifications and the fabric specified herein.

B. Connectors for ductwork systems constructed of aluminum shall be fabricated by Contractor and constructed of aluminum sheets and Specification Grade Neoprene consisting of heavy glass fabric double coated with neoprene. Connectors shall be suitable for 200 deg. F and +5 psig WP. Fabric shall be 6" wide and attached to the aluminum sheets with double lock seams. Fabric shall be Underwriters Laboratories, Inc. listed and comply with NFPA 90A. Fabric shall be Specification Grade Neoprene Type as manufactured by the Duro Dyne Corp. or approved equal by Ventfabrics, Ward Industries, and be weatherproof, fire retardant and resistant to acids, alkalies, grease and oils. Aluminum sheets shall be same as that specified under Ductwork Materials Specifications.

2.19 WALL LOUVERS

A. Wall louvers with screen will be provided under another Division of the Specifications.

B. Blank off unused portions of louvers with sandwich constructed insulated panels as indicated on Drawings. Panel sheets shall be minimum 18 gauge reinforced galvanized sheet steel with 2" thick 3 pcf density fibrous glass board insulation.

2.20 DUCT ROOF-SUPPORTS

A. Description: An H-frame style support designed to lift and stabilize a duct up off of the roof surface. The crossbar carries the weight of the duct while the sides stabilize the duct and prevent any lateral motion.

B. Materials of Construction:

1. Bases: 16 gauge Stainless steel
2. Nuts and Bolts: Stainless steel
3. Slotted Channel Framing: Galvanized
4. All other hardware: Galvanized

C. Size: Every duct support is built to the size specifications of the customer.

D. Load Capacity: Total weight not to exceed 300 lbs or 150 lbs per base.

E. Spacing: No more than 10 ft between each support. Closer spacing may be necessary to prevent loads greater than 300 lbs per support.

2.21 ROOF CURBS

A. Roof curbs for ductwork piercing the roof (single ply type) shall be factory fabricated 18" high of minimum 18 gauge galvanized steel having a 2" wide top with pressure treated wood nailer and minimum 2" thick insulation.

B. Curbs shall be continuously welded, with mitered corners and integral base plate. Design to accommodate pitched roof as required.

C. Curbs shall be Series SFJ-S as manufactured by Louvers and Dampers, Inc. Equivalent approved products of Thycurb, Penn Ventilator Co. or Roof Products & Systems Corp. will be accepted.

2.22 SCREEN

A. Screen shall consist of square mesh woven wire cloth secured to a galvanized structural steel angle or bar frame.

B. Cloth shall be 2 mesh (1/2" opening) constructed of .063" diameter galvanized wire.

C. The open area shall be 76.4%

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. Install ductwork essentially as shown on Plans and in locations to avoid interference with recessed lights, piping, general construction, etc.

B. Sizes given are inside dimensions. Keep all openings closed with protective caps or blanks during construction to prevent entrance of dirt, debris, etc.

C. Extend all access openings, damper rods and levers, to outside of external insulation for convenience of operation and maintenance.

D. Leak test system, make system airtight as approved, replace all poor joints. Submit for approval, before installation, all changes in size required by obstructions and job conditions.

E. No piping, conduit or other obstruction to airflow permitted in ductwork, except upon written permission of Owner. If permission is granted, fully protect same with airtight streamlined sleeve, soldered or brazed joint between sleeve and ductwork. Increase size of ductwork to maintain proper cross-sectional area.

F. Provide all necessary openings, sleeves, hanger inserts, framing, chases, recesses, etc. in General Construction Work and not provided by other trades.

G. Register and Grille Connections: Exposed exhaust or return, flush with face of duct; exposed supply shall be mounted outside airstream with extension collars turned in so that no raw edges are exposed.

H. Welding and Burning may not be conducted without an authorized hot work permit issued by the Fire and Safety Specialist or in his absence, the Area Supervisor and the Maintenance Supervisor.

3.02 FLEXIBLE DUCTWORK

A. Provide where indicated on Drawings.

B. Joints made with adhesive applied, as directed, to duct end or collar and tape outer liner to maintain vapor barrier.

C. Slide Duct on full depth of collar and two inches (2") onto duct end. Secure with sheet metal screws in metal spiral in addition to an approved draw band, Wraplock 5900 or equivalent.

D. Maximum length forty-eight inches (48"), but not more than eight inches (8") longer than actual distance between end of duct and collar. A maximum of one bend of no more than angle ninety (90) degrees shall be allowed in flexible ductwork.

3.03 CLEANING DUCTWORK SYSTEM

A. Clean all rubbish, dirt, etc., from system before fans are activated. Wipe clean interior or all Air Distribution Systems as they are assembled. Following installation, wipe clean accessible portion of casings, plenums, ductwork, diffusers, registers, accessories, etc.

B. Keep all openings closed during construction.

C. Pay all damages resulting from dirt blown on painted or other finished surfaces.

D. Repair or replace to satisfaction of Owner, any damaged fan wheels, dampers, or other system parts.

E. Duct System Cleanliness Tests:

1. LEED-NC Prerequisite EQ 1 requires compliance with ASHRAE 62.1-2004, in which Section 7.2.4 - "Ventilation System Start-Up" requires that distribution systems be clean of dirt and debris.

2. Visually inspect duct system to ensure that no visible contaminants are present.

3. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."

a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

3.04 INSTALLATION ROUND DUCTWORK

A. Use factory fabricated fittings for all joints in straight runs.

B. Approved sealer shall be equal to Hardcast, Inc. Apply in accordance with manufacturer's directions.

C. Provide sheet metal screws one half inch (1/2") from the joint bead for mechanical strength. Apply Hardcast to the outside of the joint extending one inch (1") on each side of the joint bead and covering the screw heads.

3.05 LEAKAGE TESTING OF AIR DISTRIBUTION SYSTEMS

A. General

1. Upon completion of work and prior to adjusting and balancing, conduct leakage tests of the various Air Distribution Systems.

2. Provide competent personnel to conduct all tests. Systems will not be considered complete until all tests have been concluded to the satisfaction of the Owner's Representative and all other parties having jurisdiction. In the event of leakage or defects, tests must be repeated after all faults are corrected.

3. Furnish all instruments, ladders, test equipment, test connections and personnel required for the tests. Electrical power and water for tests will be available from the Owner and shall be scheduled with his advanced approval.

4. Successful testing shall be certified in writing by the Balancing Subcontractor.

5. Before testing, all systems shall be cleaned as specified.

B. Leakage Testing

1. Leakage test all Air Distribution Systems in their entirety except for the following:

a. Supply ducts

b. Transfer Air Ducts

c. Discharge ducts from exhaust fans above roof that discharge to atmosphere.

2. The leakage amounts for Air Distribution Systems shall not exceed the criteria specified in the air distribution systems Material and/or Construction Specifications.

3. Tests shall be performed at static pressures equal to the Pressure Classes specified in the Material and/or Construction Specifications.

4. When the leakage exceeds the specified requirements between fan delivery air quantities and the sum of air flow measurements taken at terminal air devices as determined by Testing, Balancing and Adjusting of the completed systems, the Contractor shall perform additional sealing of the Air Distribution System including the use of Hard Cast, Inc. tapes and adhesive or similar materials compatible with the particular system, as required to obtain the Leakage Class or classes specified for that particular system. The following is allowable air leakages as a percentage of design flow rate:

   a. 1% - ductwork built to duct construction class above 2 inches wg (upstream of volume controls).

   b. 2% - ductwork built to duct construction class 2 inches wg or below (downstream of volume control boxes) for system AHU-B/EAHU-B, AHU-C/EAHU-C, lab portion of ductwork for system AHU-A/EF-A-1A and EF-A-1B and XP exhaust systems.

   c. 3% - ductwork built to duct construction class 2 inches wg or below (downstream of volume control boxes) for office areas of system AHU-A, return system RF-A-1 and cafeteria air system.

   d. Upon completion of additional sealing, Repeat testing and continue to repeat the testing and sealing procedures as necessary to meet allowable leakage specifications.

5. Test apparatus shall consist of an ASME qualified orifice meter, rotary blower with damper, straightening vanes or perforated plate to achieve even flow, pressure indicating devices and accessories necessary to connect the metering system to the selected test portion of the Air Distribution System.

6. Provide all temporary services, all test apparatus, all temporary seals and all qualified personnel necessary to conduct specified leakage testing.

7. Leakage testing shall be done by the contractor, under the on-site direction and supervision of the Testing, Adjusting and Balancing Agency selected by the Contractor to perform the Testing, Adjusting and Balancing of Heating, Ventilating, and Air Conditioning Systems on this project. Contractor shall pay for Agency's services. The Agency shall also compile data on the leakage testing work and submit complete Air Duct Leakage Test Summary Reports thereon.

8. Perform all Leakage Testing of Air Distribution Systems prior to the application of insulation and prior to the systems being enclosed by surrounding construction.

9. General Procedures for Leakage Testing, Leakage Classification, Test Apparatus and Test Reports shall be provided as described in the HVAC Air Duct Leakage Test Manual, 1985, First Edition as published by the Sheet Metal and Air

Conditioning Contractors National Association, Inc. (SMACNA).

3.06 SEALING REQUIREMENTS FOR LEED COMPLIANCE

A. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. Outdoor, Supply-Air Ducts: Seal Class A.
3. Outdoor, Exhaust Ducts: Seal Class C.
4. Outdoor, Return-Air Ducts: Seal Class C.
5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class B.
6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class A.
7. Unconditioned Space, Exhaust Ducts: Seal Class C.
8. Unconditioned Space, Return-Air Ducts: Seal Class B.
9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class C.
10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.07 AIR AND WATERTIGHT SHEET METAL WORK

A. Where water may accumulate, ductwork, plenums, etc. shall be made watertight by soldering, brazing or welding of joints.

1. Pitch ducts toward waste points and/or toward louvers.
2. Provide drains from low point to suitable waste point or provide louver weepholes, etc., as required and approved.

3.08 SMOKE DETECTORS

A. Smoke detectors will be furnished by Electrical Contractor. Mechanical Contractor shall install all detectors located in ductwork as directed by the Electrical Contractor. See Drawings for quantity and approximate location.

B. Provide access doors when not accessible from access doors provided for smoke dampers.

3.09 DUCT HANGERS AND SUPPORTS

A. Provide hangers and supports for ductwork. Do not hang one duct from another nor from piping and conduit. Do not use perforated band iron, wire, nor chain as hangers.

B. Vertical ducts shall be supported at each floor through which they pass.

C. Provide hangers and supports in accordance with applicable SMACNA standards, details and notes on the Drawings and the Specifications.

D. Do not insulate duct supports or hanger rods with ducts. Space rods to clear insulation and vapor barrier.

3.10 DUCT SLEEVES

A. Refer to Article DUCT SAFING in this Section of the Specifications and CUTTING AND PATCHING.

B. Provide sleeves for air distribution systems penetrating all new and existing building construction, and/or as shown on the Drawings.

C. Openings to accept duct sleeves in new building construction will be formed in the building construction by the Contractor for General Construction work and shall be patched under this Division of the Specifications. Openings to accept duct sleeves in existing building construction shall be provided under this Division of the Specifications.

D. Sleeve requirements for fire dampers shall be as directed by the fire damper manufacturer. Refer to Article, FIRE DAMPERS in this Section of the Specifications.

E. Installations shall be arranged so that no voids or openings exist where air distribution systems penetrate building construction.

F. Unless otherwise indicated, where air distribution systems pass through waterproof floors and concrete curbs are not provided, provide and install angle iron frame and sleeve. Vertical leg of angle shall project at least one and a half (1-1/2) inches above finished floor. Caulk watertight.

G. Sleeve layout drawings shall be furnished as follows:

1. Prepare sleeve layout drawings drawn to a scale of 1/4" = 1'-0" and show the requirements for all sleeves. Drawings shall be completely dimensioned and show the location of all sleeves including references from columns, etc. Drawings shall clearly indicate the type of sleeve application for each location as related to the details shown on the contract drawings.

2. Furnish a sepia set of drawings to the Contractor for General Construction for his use in providing the proper size openings in new construction and for his information on the location of all sleeves.

H. The Mechanical Contractor shall be fully responsible for the final and correct location of all sleeves. If sleeves are omitted or incorrectly located the Mechanical Contractor shall rectify. Additionally, if sleeves are omitted or incorrectly located in new construction, the Mechanical Contractor shall, at his own expense, engage the trade who originally installed the general construction work to make the necessary corrections.

3.11 DUCT FIRESTOPPING

A. General

1. Work under this article applies to air ducts/sleeves that penetrate floors, walls and other partitions of building construction that are required to have a fire resistive

rating but do not require the installation of fire dampers.

2. Externally installed insulation systems shall stop at the floors, walls and other partitions of the building construction and shall not pass through the sleeve.

3. The installed firestopping systems shall meet the approval of the authorities that have jurisdiction.

4. The Contractor shall submit shop drawings on the Manufacturer's technical data for each product including product description, specifications and storage requirements.

5. The distance between the air duct and sleeve shall not exceed one (1) inch around entire perimeter of air duct. The space between the air duct and sleeves shall be solidly filled as follows:

   a. Walls and other partitions: Install Thermafiber Mineral Fireproofing Board or approved equal by Roxul, Owens Corning or equal, in space and arrange to create a two (2) inch recess in from both sides of walls or other partitions of building construction. On walls and other partitions less than six (6) inches wide, recesses shall be one (1) inch deep.

   b. Floors: Install Thermafiber Mineral Fireproofing Board, or approved equal by Roxul, Owens Corning or equal, in space and arrange to create a two (2) inch recess in from top side of floors of building construction.

   c. Apply Thermafiber Smoke Seal Caulking, or approved equal by 3M or equal, to the full thickness/depth of the recesses created by the fireproofing board as described above and finish smooth with adjacent surfaces of building construction.

6. If required by the inspecting authorities, the Contractor shall:

   a. Remove sheet metal safing angles to expose firestopping for inspection. Removal of safing angles shall be limited to six (6) different locations selected by the inspecting authority.

   b. Reinstall sheet metal safing angles where removed for inspection.

B. Sleeves

1. Refer to details shown on Drawings.

2. Refer to requirements for sleeves in this Section of the Specifications.

C. Refer to the following:

1. Article, FIRE DAMPERS in this Section of the specifications for requirements on air ducts penetrating floors, walls and other partitions of building construction that have a fire resistive rating and require the installation of fire dampers.

2. SECTION 23 0700 - INSULATION for details on insulation of Air Distribution Systems.

3.12 DUCT SAFING

A. Provide safing for air distribution systems as specified and as shown on Drawings.

B. Safing exposed in finished areas for uninsulated stainless steel and aluminum air distribution system ductwork shall be arranged to completely conceal duct sleeves.

C. Safing in air streams shall be installed air tight.

3.13 AIR EXTRACTORS

A. Where shown on the Drawings, provide a multiblade adjustable air extractor at branch duct and/or air outlet take-offs.

3.14 BRANCH DUCT TURNING VANES

A. Where shown on the Drawings, provide a multiblade air turning device at branch duct take-offs.

3.15 MANUAL VOLUME CONTROL DAMPERS (HAND DAMPERS)

A. Where indicated on the Drawings, provide manual volume control dampers to balance air distribution.

B. Access doors shall be provided at each volume control damper where indicated on Drawings.

3.16 BACK DRAFT DAMPERS

A. Provide as shown on the Drawings.

B. Install and adjust counter balancing devices in accordance with manufacturer's requirements.

3.17 FIRE DAMPERS

A. Fire dampers shall be provided where shown on the Drawings. Location and protection procedure must meet the requirements outlined in the latest edition of NFPA 90A. All fire dampers shall be Underwriters Laboratories, Inc. (UL) tested, approved and labeled and meet the minimum characteristics outlined in NFPA 90A and be installed in strict accordance with manufacturing conditions of listing by UL.

B. Install in accordance with the fire damper manufacturer's complete instructions on the installation procedures required by Underwriters Laboratories.

C. Provide access door at each fire damper, unless damper linkage is directly accessible. Identify all fire damper access doors by stenciling with bright red paint the words "FIRE DAMPER ACCESS".

3.18 ACCESS DOORS/PANELS

A. Provide access doors in ductwork as indicated on the Drawings and as Specified. Access panels where specified or indicated on Drawings shall be considered as access doors and provided in accordance with the Specifications. Install in accordance with manufacturer's

instructions.

B. Install stainless steel access doors for in-room return/exhaust HEPA Filters air tight with bolted gaskets and additional silicone sealants as detailed on the Drawings and specified herein.

3.19 FLEXIBLE CONNECTORS

A. Provide flexible connectors as indicated on the Drawings for duct connections to air handling equipment.

B. Connections shall be made with a two inch (2") space between duct and equipment collars, installed in line, and with one inch (1") excess material folded so as not to interfere with airflow through connection. Connections shall be airtight connections and flexible connectors on liquid tight ductwork shall be liquid tight.

3.20 WALL LOUVERS

A. Blank unused portions of louvers with sandwich constructed insulated panels as indicated on Drawings.

B. Make all joints weather tight and securely fasten panels to louver construction. Submit detailed drawings of panel arrangements and joints and mounting details. Seal air and watertight.

3.21 SCREEN

A. Provide screen as shown on the Drawings.

B. Unless otherwise indicated, screen shall be removable and secured with non-corrosive bolts and nuts.

END OF SECTION

SECTION 233400
FANS

PART 1– GENERAL

1.01 WORK INCLUDED

A. Power Roof Ventilator

B. Utility fan

C. Inline Fan

D. Motors and drives.

E. Inlet/outlet screens.

1.02 RELATED WORK

A. Section 23 0513 – Motors

B. Section 23 0548 – Noise and Vibration Control

C. Section 23 0700 - Mechanical Insulation

D. Section 23 3000 – Ductwork & Accessories

E. Section23 0593 – Testing, Adjusting and Balancing

1.03 REFERENCES

A. AMCA 99 - Standards Handbook.

B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.

C. AMCA 300 - Test Code for Sound Rating Air Moving Devices.

D. AMCA 301 - Method of Calculating Fan Sound Ratings from Laboratory Test Data.

E. ANSI/AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.

F. SMACNA - Low Pressure Duct Construction Standard.

1.04 QUALITY ASSURANCE

A. Performance Ratings: Conform to AMCA 210 and beat the AMCA Certified Rating Seal.

B. Sound Ratings: AMCA 301 tested to AMCA 300 and bear AMCA Certified Sound Rating Seal.

C. Fabrication: Conform to AMCA 99.

1.05 SUBMITTALS

A. Shop Drawings:

1. Mfg. And Model No.
2. Accessories Provided
3. Dimensioned Drawing
4. Motor Data
5. CFM, total static pressure, ext. static pressure
6. Fan Classification Curves, Operating Data
7. Wiring Diagrams

B. Operating Instructions:

1. All information provided under shop drawings plus following:
    1) Installation Instructions
    2) Operating and Maintenance Instructions
    3) Recommended Spare Parts
    4) Dimensional Drawing

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Division 1.

B. Store and protect products under provisions of Division 1.

C. Protect motors, shafts, and bearings from weather and construction dust.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Aldes

B. Greenheck

C. Continental Fan Manufacturing Co.

2.02 UTILITY FAN

A. Fan Assembly

1. Backward Inclined: Steel construction with smooth curved inlet flange, heavy backplate, backwardly curved blades welded or riveted to flange and backplate; cast iron or cast steel hub riveted to backplate and keyed to shaft with set screws.
2. Airfoil Wheel: Steel construction with smooth curved inlet flange, heavy backplate die formed hollow airfoil shaped blades continuously welded at tip flange, and backplate; cast iron or cast steel hub riveted to backplate and keyed to shaft with set screws.

3. Shafts: Hot rolled steel, ground and polished, with keyway, protectively coated with lubricating oil.

4. Fan Bearings: ANSI/AFBMA 9, L-10 life at 200,000 hours, heavy duty pillow block type, self-aligning, grease-lubricated ball bearings, or ANSI/AFBMA 1, L-50 life at 400,000 hours, pillow block type, self-aligning, grease-lubricated roller bearings.

5. Where used for kitchen exhaust application. The fan shall UL listed for removal of smoke and grease laden vapors (UL762) Unit shall be up-blast configuration. Provide access door, weather cover and drain.

B. Motors and Drives

1. Motors: Provide open drip proof motor on adjustable base for ease in belt tension adjustment. Motors shall be heavy duty, drip proof, ball bearing type, matched to the fan load and furnished at the specified voltage, phase and enclosure and efficiency. .

2. Provide variable speed motors for direct drive fans

3. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, keyed. Variable and adjustable pitch sheaves for motors 15 hp and under, selected so required rpm is obtained with sheaves set at mid-position. Fixed sheave for 20 hp and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.

4. Belt Guard: Fabricate to SMACNA Low Pressure Duct Construction Standards; of 12 gage, 3/4-inch diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

C. Housing

1. Heavy gage steel, spot welded for AMCA 99 designated Class I and II fans, and continuously welded for Class III, adequately braced, designed to minimize turbulence with spun inlet bell and shaped cut-off.

2. Factory finish before assembly with enamel or prime coat.

3. Provide bolted construction with horizontal flanged split housing.

4. Weatherproof motor and drive covers at utility sets.

5. Provide inspection access panels at the wheels of all blowers.

6. Externally paint fans exposed to weather to provide corrosion resistance to the environment.

D. Accessories

1. Fixed Inlet Vanes: Steel construction with fixed cantilevered inlet guide vanes welded to inlet bell.

2. Inlet/Outlet Screens: 1/2-inch mesh galvanized steel welded grid.

3. Access Doors: Shaped to conform to scroll with quick opening latches and gaskets.

4. Scroll Drain: 3/4-inch steel pipe coupling welded to low point of fan scroll.

5. Weatherproof motor and drive covers.
6. Extended bearing lubrication fittings to assure easy access to lubrication points.
7. Heat slinger
8. Provide NEMA-3 disconnect switch at each fan.

2.03 INLINE FAN

A. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced.

B. Motors shall be heavy duty, drip proof, ball bearing type, matched to the fan load and furnished at the specified voltage, phase and enclosure and efficiency. Motors shall be readily accessible for maintenance.

C. The fan housing shall be of the square design constructed of heavy gauge galvanized steel and shall include square duct mounting collars.

D. Fans construction shall include two removable access panels located perpendicular to the motor mounting panel. The access panels must be of sufficient size to permit easy access to all interior components.

E. Fan shall be designed for quiet operation.

F. Provide spring type vibration isolators.

G. A NEMA-1 (NEMA_3 for outdoor installation) disconnect switch shall be provided for each fan. Factory wiring shall be provided from motor to the handy box.

H. Fans for gas meter room ventilation shall be class B spark resistant construction and furnished with spark proof disconnect switch. Motors in air stream shall be Totally Enclosed Air Over type.

2.04 POWER ROOF VENTILATORS

A. Fan Assembly

1. Fan Wheel: Non-overloading centrifugal type, fabricated of aluminum or steel, statically and dynamically balanced at factory. Provide grease-packed wheel bearings of the self-aligning, ball bearing, pillow-block type.
2. Drive Assembly: Electric motor-driven V-belt drive, with cast iron or steel pulleys. Provide motor pulley of the variable pitch type, to permit adjustment of fan speed 10 percent above or below speed shown.
3. Direct drives shall have speed controller in junction boxes.
4. Motor: Enclosed, fan cooled. Speed(s) as indicated suitable for operation with the shaft vertical.
5. Electric motor and fan assembly, enclosed in a storm-proof aluminum housing, properly braced and stiffened to form a rigid unit, which will withstand a horizontal pressure of 30 pounds per square foot of projected area.

B. Vibration isolation.

1. Assembly complete with an Underwriters Laboratory Inc. approved non-fused safety-type disconnect switch, located under the fan housing. Factory installed wiring shall be in flexible metal conduit.

C. Housing

1. Fabricate from spun aluminum, with heavy-duty corrosion-resistant metal hinges and friction catches, to permit convenient access to motor and fan assembly. Provide structural reinforcing members to support fan wheel, motor and bearings, and vibration elimination devices to prevent transmission of vibration to housing.

2. Screen air discharge with ½" aluminium (.047") bird screen.

3. Accessories

a. Provide 1/2-inch aluminum bird screens.

b. Provide 12" high , factory fabricated aluminum insulated roof curb with at least 30% sound reduction.

c. Provide gravity backdraft dampers, aluminum frame and blade construction on discharge of exhaust fans.

2.05 CEILING MOUNT DIRECT DRIVE FAN

A. Type A

1. Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy gauge galvanized steel. The housing interior shall be lined with 0.5 in acoustical insulation. The outlet duct collar shall include an aluminum backdraft damper and shall be adaptable for horizontal or vertical discharge. The grille for sizes 50-390 shall be constructed of high impact polystyrene and for sizes 410-1550, the grille shall be constructed of aluminum. Grilles shall be non-yellowing. The access for wiring shall be external. The motor disconnect shall be internal and of the plug in type. The motor shall be mounted on vibration isolators. The fan wheel(s) shall be of the forward curved centrifugal type, constructed of galvanized steel and dynamically balanced.

2. All fans shall be licensed to bear the AMCA Certified Ratings Seals for sound and air performance and shall be U.L. Listed and C.S.A. approved.

3. Ceiling or wall mount fans shall be Model SP-A as manufactured by Greenheck.

B. Type B

1. Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of steel. The steel duct collar shall be 6 in in diameter to accept 6 in round ductwork and shall include a backdraft damper. The grille shall be constructed of non-yellowing high impact polystyrene and attached to the housing with screws. The access for wiring shall be external. The motor disconnect shall be internal and of the plug in type. The motor shall be mounted on vibration isolators. The fan wheel shall be of the forward curved centrifugal type, constructed of calcium carbonate filled polypropylene and dynamically balanced.

2. All fans shall be licensed to bear the AMCA Certified Ratings Seals for sound and air performance and shall be U.L. Listed and C.S.A. approved.

3. Ceiling or wall mount fans shall be Model SP-B as manufactured by Greenheck of Schofield, Wisconsin.

C. Type C

1. Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of steel. The plastic duct collar shall be a tapered sleeve for ease of connection to 3 in and 4 in round ductwork and shall include a backdraft damper. The grille shall be constructed of non-yellowing high strength polymer and attached to the housing with torsion springs. The wheels shall be constructed of high strength polymer. The access for wiring shall be external. The motor disconnect shall be internal and of the plug in type.

2. All fans shall bear the AMCA Certified Ratings Seals for sound and air performance and shall be U.L. Listed.

3. Fans shall be Model SP-C as supplied by Greenheck, Schofield, Wisconsin.

PART 3- EXECUTION

3.01 INSTALLATION

A. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

B. Install utility fans of roof equipment rails. Provide spring isolators with minimum 2 inch deflection. Refer to specification section 23 0548.

C. Provide spring and neoprene hangers for inline fans. Refer to specification section 23 0548.

D. Provide roof curb for roof power ventilators.

E. Install flexible connections specified in Section 23 0548 between fan inlet and discharge ductwork. Ensure metal bands of connectors are parallel with minimum one-inch flex between ductwork and fan while running.

F. Provide back draft damper at the point of discharge to the outdoors.

END OF SECTION

SECTION 233700
AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies administrative and procedure requirements regarding mechanical work. Additional requirements are specified in various sections of Division 23 and also may be required during the execution of work due to project conditions.

B. Work Included: The work shall include, but not be limited to, the following:

1 Diffusers

2 Grilles

3 Registers

4 Accessories for regulation and distribution.

C. Related Work Specified Elsewhere

1 Section 230500 Basic Mechanical Requirements

2 Section 233000 Ductwork and Accessories

1.2 QUALITY ASSURANCE

A. Codes and Standards

1 ARI Compliance: Test and rate air outlets and inlets in accordance with ARI 650 "Standard for Air Outlets and Inlets".

2 ASHRAE Compliance: Test and rate air outlets and inlets in accordance with ASHRAE 70 "Method of Testing for Rating the Air Flow Performance of Outlets and Inlets".

3 ADC Compliance: Test and rate air outlets and inlets in certified laboratories under requirements of ADC 1062 "Certification, Rating and Test Manual". Provide air outlets and inlets bearing ADC Certified Rating Seal.

4 AMCA Compliance: Test and rate louvers in accordance with AMCA 500 "Test Method for Louvers, Dampers and Shutters". Provide louvers bearing AMCA Certified Rating Seal.

5 NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.3 SUBMITTALS

A. Submit the following in accordance with the requirements specified in Section 23 0500.

1 Product Data: Submit manufacturer's technical product data for air outlets and inlets including data sheet for each type of air outlet and inlet, and accessories furnished;

indicate materials of construction, finish, mounting details and method of assembly of components. Mark data with specification type.

2 Shop Drawings

a. Shop drawings of diffusers, registers and grilles must include complete schedule for each diffuser outlet type indicating drawing designation, room location, number furnished, model number, size and accessories furnished. Mark data with specification type.

b. In all cases, prepare and submit a schedule of grilles, diffusers and registers to the Architect for approval of size and design of outlets before ordering for installation.

c. Submit samples for approval where required by Architect and three samples of each type of finish furnished.

d. Equipment manufacturer shall submit engineering data in a manner to facilitate convenient review of the following factors: traverses, throw and drop, noise criteria ratings for each unit, sizes, free area for Air balance, indicate selection on data and quality of construction.

e. Engineering data shall include non-aspiration profile, temperature and velocity traverses in space.

3 Maintenance Data: Submit maintenance data, including cleaning instructions for finishes, and spare parts lists. Include this data, product data, and shop drawings in maintenance manual; in accordance with requirements of Division 1.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver air outlets and inlets wrapped in factory-fabricated containers. Identify on outside of container type of outlet or inlet and installation location. Avoid crushing or bending and prevent dirt and debris from entering and settling in devices.

B. Store air outlets and inlets in original cartons and protect from weather and construction work traffic. Where possible, store indoors. When necessary to store outdoors, store above grade and enclose with waterproof wrapping.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Approved manufacturers of diffusers, linear grilles and registers are as noted in the appropriate specification paragraph.

B. The approved manufacturers of other grilles and registers shall be as noted or the approved equal products of the following:

1 Titus Products.

2 Anemostat Products Div.

3 Krueger

C. Approval of manufacturer does not necessarily constitute approval of its product as equal to that specified. Immediately after award of the contract and prior to the start of construction, submit to the Architect for approval a complete written summary of the material proposed to be furnished in accordance with Shop drawing requirements.

2.2 MATERIALS AND EQUIPMENT

A. Finishes: Provide the following factory finish unless otherwise specified:

1 Diffusers, Grilles and Registers: Gray or White Prime Coat when mounted on exposed duct or in walls. Baked enamel, off-white similar to Titus No. 25 when mounted in ceiling.

2 Accessories: Flat Black Lacquer or Enamel.

B. Accessories - Regulation and Distribution: At each supply diffuser, register and grille, provide accessories to accomplish final regulation of air volume and uniform distribution of air flow over the entire outlet. Provide the following as a minimum:

1 Supply Diffusers for Volume Regulation: Opposed blade dampers.

C. Spiral Duct Mounted Supply Grille – LG-1

1 Aluminum supply grilles shall be TITUS direct spiral duct-mounted supply grilles model S301FS (single deflection) for the sizes and mounting types as shown on the plans and outlet schedule. The deflection blades shall be available parallel to the short dimension of the grille and shall include air scoop damper.

2 All supply grilles shall be constructed with end caps with foam gaskets for a tight seal to any size duct diameter. All supply grilles shall be constructed with a 1-inch wide border.

3 Blades shall be constructed of heavy duty extruded aluminum and shall be spaced ¾-inch apart. Blades shall extend completely through the side frame on each side to ensure stability throughout the complete cfm operating range of the grille. Blades shall be individually adjustable without loosening or rattling and shall be securely held in place with tension wire. (US8F: perforated face will have 3/16-inch holes on ¼-inch staggered centers.)

4 Air scoop damper/extractor shall be constructed of heavy duty aluminum and must be must be operable from the face with a screwdriver.

5 The grille finish shall be #34 clear anodized finish.

6 The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

D. Filter Return Grille – (RG-1,2)

1 Stainless steel (SS304) return grilles shall be TITUS Model 350R_F2-SS(3/4-inch blade spacing) of the sizes and mounting types shown on the plans and outlet schedule. The fixed deflection blades shall be available parallel to the long or short dimension of the grille. Corners shall be welded with full penetration resistance welds. Screw holes shall be counter-sunk for a neat appearance.

2 Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be firmly held in place by mullions from behind the grille and fixed in place by welding.

3 Hinge-tab mechanism shall allow hinging and removal of grille from the filter frame with quarter turn release fasteners for easy replacement and cleaning.

4 The grille finish shall be standard mill finish #04. .

5 Grilles shall have a 2" depth filter frame.

6 The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

E. Supply Grilles (WG-1)

1 Aluminum supply grilles shall be TITUS Model 300F (double deflection) of the sizes and mounting types shown on the plans and outlet schedule. The deflection blades shall be available parallel to the short dimension of the grille or register. Construction shall be of aluminum with a 1¼-inch wide border on all sides. Sizes 24 x 24 inches and below shall have roll-formed borders with a minimum thickness of 0.032 inch. Larger sizes shall be constructed using continuous aluminum extrusions with a nominal thickness of 0.040 through 0.050 inch and shall be interlocked at the four corners and mechanically staked to form a rigid frame. Screw holes shall be countersunk for a neat appearance.

2 Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be spaced on ¾-inch centers. Blades shall have friction pivots on both sides to allow individual blade adjustment without loosening or rattling or be inserted through the frame and held tight with steel friction wire interlocked to the frame on both ends of each side. Plastic blade pivots are not acceptable.

3 Optional opposed blade volume damper shall be constructed of heavy gauge steel or aluminum. Damper must be operable from the face of the grille.

4 The grille finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315° F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.

5 The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

F. Supply Grilles (WG-2)

1 Stainless Steel supply grilles shall be TITUS Model 300RS-SS (single deflection) of the sizes and mounting types shown on the plans and outlet schedule. The deflection blades shall be available parallel to the short dimension of the grille.

2 Construction shall be of 304 stainless steel with a 1 3/8-inch wide border on all sides.

Screw holes shall be countersunk for a neat appearance. Corners shall be welded with full penetration resistance welds.

3 Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be spaced on ¾-inch centers. Blades shall have friction pivots on both ends to allow individual blade adjustment without loosening or rattling. Plastic blade pivots are not acceptable.

4 Optional opposed-blade volume damper shall be constructed of 304 stainless steel. Damper must be operable from the face of the grille. The grille finish shall be #04 mill.

5 The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

G. Laminar Flow Diffuser (LFD-1, 2)

1 Laminar flow diffuser shall be TITUS model number TLF-SS. Diffusers shall be constructed using a maximum 6 inches tall back-pan designed for optimum performance with the diffuser. The back-pan shall have integral hanger tabs for securing the unit to the overhead structure to prevent falling in case of earthquakes or other ceiling damage.

2 Each unit shall have an integral internal baffle for evenly distributing air over the entire face of the diffuser. Each unit shall have an integral volume damper accessible through the face of the diffuser.

3 The face of the diffuser shall be constructed of 22-gauge 304 stainless steel perforated with 3/32-inch diameter holes on ¼-inch centers. The free area of the face shall be 13 percent. The face shall be secured in place by quarter-turn fasteners for quick removal and sanitizing.

4 Each unit must have a removable center plug for adjusting the damper.

5 Each diffuser shall include HEPA filter rack.

6 Performance: NC values shall be published. Throw for terminal velocities of 75, 50 and 30 fpm shall be published along with corresponding pressure drop. Performance tests shall have been conducted in ASHRAE Standards 70-91 and 113-90.

H. Exhaust Grille (EG-1)

1 Return grilles shall be TITUS Model 50F for the sizes and mounting types as shown on the plans and outlet schedule. Return grilles must provide a free area of at least 90%. Outer borders shall be constructed of heavy extruded aluminum with a thickness of 0.040-0.050 inch and shall have countersunk screw holes for a neat appearance. Border width shall be 1¼ inches on all sides and shall be interlocked at the four corners and mechanically staked to form a rigid frame. Choice of three sizes of aluminum grid: ½ x ½ x ½ inch, ½ x ½ x 1 inch, or 1 x 1 x 1 inch shall be available.

2 Optional opposed-blade volume damper shall be constructed of heavy gauge steel or aluminum. Damper must be operable from the face of the grille.

3 The grille finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.

4 The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

I. Linear Bar Floor Grille (UFD-1)

1 Titus Model CT-TAF-L is a fixed linear bar diffuser for underfloor perimeter return applications. The core drops into frame.

2 The grille is extruded aluminum construction. All deflection bars are fixed and are parallel to the long dimension. Fixed Bars are extruded aluminum.

3 Standard finish is #26 white.

J. Damper Controller - Type RDC

1 Assembly shall consist of opposed blade volume damper, flexible metal covered stainless steel cable terminating in 1/8 inch hexagon socket head and necessary accessories to make a complete installation. Operator and arranged for flush concealed mounting. Young Regulator Co. or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions at the job site where work of this section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.2 PREPARATION

A. Examine the Contract Drawings and specifications in order to insure the completeness of the work required under this Section.

B. Verify measurements and dimensions at the job site and cooperate in the coordination and scheduling of the work of this Section with the work of related trades, so as not to delay job progress.

C. Provide templates as required to related trade for location of support and anchorage items.

3.3 INSTALLATION

A. Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended functions.

B. Coordinate with other work, including ductwork and duct accessories, lighting, structural

and architectural elements, as necessary to interface installation of air outlets and inlets with other work.

C. Locate ceiling air diffusers, registers, and grilles, as indicated on general construction "Reflected Ceiling Plans" or as approved by Architect.

3.4 SPARE PARTS

A. Furnish to Owner, with receipt, 3 operating keys for each type of air outlet and inlet that requires them.

END OF SECTION

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SECTION 234100
PARTICULATE AIR FILTRATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Pleated panel filters.
   2. HEPA filters

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include dimensions; operating characteristics; required clearances and access; rated flow capacity, including initial and final pressure drop at rated airflow; efficiency and test method; fire classification; furnished specialties; and accessories for each model indicated.

B. LEED Submittals:

   1. Product Data for Prerequisite EQ 1: Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."
   2. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.

C. Shop Drawings: For air filters. Include plans, elevations, sections, details, and attachments to other work.

   1. Show filter rack assembly, dimensions, materials, and methods of assembly of components.
   2. Include setting drawings, templates, and requirements for installing anchor bolts and anchorages.

D. Operation and Maintenance Data: For each type of filter and rack to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. 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.

B. ASHRAE Compliance:

1. Comply with applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality"; Section 5 - "Systems and Equipment"; and Section 7 - "Construction and Startup."
2. Comply with ASHRAE 52.1 for arrestance and ASHRAE 52.2 for MERV for methods of testing and rating air-filter units.

C. Comply with NFPA 90A and NFPA 90B.

1.5 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Provide two complete set(s) of filters for each filter bank.

PART 2 - PRODUCTS

2.1 PLEATED PANEL FILTERS

A. Description: Factory-fabricated, self-supported, extended-surface, pleated, panel-type, disposable air filters with holding frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AAF International (Perfect Pleat Ultra basis of design)
b. Airguard.
c. Camfil Farr.

B. Filter Unit Class: UL 900, Class 2

C. Media: Duraflex media, fibers assemble din closely controlled blends incorporating antimicrobial.

1. Adhesive shall have a VOC content of 80 g/L or less when calculated according to Title 40 CFR 59, Subpart D (EPA Method 24).
2. Media shall be coated with an antimicrobial agent inhibiting microbial growth throughout filter's useful life.
3. Self-supporting media designed for strength.
4. Media shall be bonded to frame to prevent air bypass.
5. Support members on upstream and downstream sides to maintain pleat spacing.

D. Filter-Media Frame: Unitized, die-cut box, beverage board frame with double thickness in the perimeter wall.

E. Mounting Frames: Part of return or grilles as noted on plans.

F. Capacities and Characteristics as scheduled on plans, size to match return filter frames.
1. MERV Rating: As scheduled when tested according to ASHRAE Test Standard 52.2.

2.2 HEPA FILTER

A. General: provide HEPA filter bank for surgical suite laminar flow diffuser.

B. Manufacturers:
1. AAF International (Perfect Pleat Ultra basis of design)
2. Airguard.
3. Camfil Farr.

C. Performance Requirements:
1. Penetration: Aerosol penetration for any HEPA filter shall not exceed 0.03% (0.0003) at 0.3 micrometer particle size.
2. Resistance: Airflow resistance across the HEPA filter shall not exceed 1.3 in wg.
   a. The filter maximum operating temperature is 250 °F, and the maximum relative humidity (R.H.) is 100%.
   b. Filter is scan tested for leaks at an air flow of 100 FPM.

D. Construction

1. Media: Microfine glass media formed into pleats separated by corrugated aluminum separators or Filter media is 007 Dimple-pleat (ME-D0700). Pack style is 2" dimple pleat. Filter is constructed of fire-rated materials per standard: UL-900 class 1.

2. HEPA Filter Case Materials:
   a. Structural Material: Extruded anodized aluminum filter case material shall be in accordance with ASME AG-1, FC-3000, except that Type I cases are not acceptable due to the use of cadmium.
   b. Fire Retardant Material: Filter case material that must be fire retardant shall be in accordance with ASME AG -1, FC-3000.
   c. Separator Material: Separator material including acid resistant separators shall be in accordance with ASME AG-1, FC-3000. In addition to the requirements of ASME AG-1, the separator shall be provided with a "turned edge" prior to corrugation to protect the filter media.
   d. Adhesives: Adhesives shall be in accordance with ASME AG-1, FC-3000.
   e. Seals: Filter shall have downstream gel seal to mate with diffuser HEPA knife edge. The sealant material shall be in accordance with ASME AG-1, FC-3000. The sealant shall be nonflammable as defined in ASTM D 92; e.g., no flash at 450 0 F (232 0 C) or below; with a fire retardant rating of V-0 per UL-94. The DOE-STD-3020-2005 9. gelatinous seal substance shall be corrosion resistant, shall not relax, crack, separate, or stick or adhere to the knife-edge, and shall be insoluble in water. Evaporation shall be less than 2% when tested in accordance with SAE AS-8660C for 24 hours at 390 0 F (198 0 C).

3. Filter Pack Construction:

a. Filter packs shall be constructed in accordance with ASME AG-1, FC-4000 and 6000 except that no splices or patches are allowed in the filter media. Repair of pin holes and other defects is not acceptable.

b. Media Velocity (Effective Media Area): The total effective media area provided within the filter pack shall be such that average face velocity (rated airflow divided by the effective filter media area) shall not exceed 5.0 ft/min (1.52 m/min) at the rated airflow.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Position each filter unit with clearance for normal service and maintenance. Anchor filter holding frames to substrate.

B. Install filters in position to prevent passage of unfiltered air.

C. Install filter gage where indicated on plans.

D. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing with new, clean filters.

E. Coordinate filter installations with duct and air-handling-unit installations.

3.2 CLEANING

A. After completing system installation and testing, adjusting, and balancing of air-handling and air-distribution systems, clean filter housings and install new filter media.

END OF SECTION 234100

SECTION 237432

PACKAGED ROOFTOP UNITS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 specification sections, apply to this section.

1.02 GENERAL DESCRIPTION

A. This section includes the design, controls and installation requirements for packaged rooftop units / outdoor air handling units.

1.03 QUALITY ASSURANCE

A. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

B. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.

C. Unit shall be certified in accordance with ANSI Z21.47b/CSA 2.3b and ANSI Z83.8/CSA 2.6, Safety Standard Gas-Fired Furnaces.

D. Unit Energy Efficiency Ratio (EER) shall be equal to or greater than prescribed by ASHRAE 90.1, 2007 Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.

E. Unit shall be safety certified by ETL and be ETL US and ETL Canada listed. Unit nameplate shall include the ETL/ETL Canada label.

F. Unit and components shall be designed, manufactured, and independently analyzed, rated, and certified to meet with the seismic compliance standards of the International Building Code, 2003 edition, Section 1621. If requested, unit shall be provided with Certificate of Compliance from an independent certifying Professional Engineer clearly indicating that the unit and components meet seismic design requirements.

1.04 SUBMITTALS

A. Product Data: Literature shall be provided that indicates dimensions, operating and shipping weights, capacities, ratings, fan performance, filter information, factory supplied accessories, electrical characteristics and connection requirements. Installation, Operation and Maintenance manual with startup requirements shall be provided.

B. Shop Drawings: Unit drawings shall be provided that indicate assembly, unit dimensions, construction details, clearances, and connection details. Computer generated fan curves for each fan shall be submitted with specific design operation point noted. Wiring diagram shall be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

1.05 LEED SUBMITTALS

A. Product Data for Credit EA 4: Documentation required by Credit EA 4 indicating that equipment and refrigerants comply.

B. Product Data for Prerequisite EQ 1: Documentation indicating that units comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."

C. Product Data for Prerequisite EA 2 and LEED-NC Credit EA-1: Documentation indicating equipment efficiency equal to or in excess of minimum efficiency required by ASHRAE / IESNA 90.1-2007

D. Product Data for LEED-NC Credit EQ-4.1: Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Product Data for LEED-NC Credit EQ-3.1: Filters have MERV 13 rating when tested according to ASHRAE 52.2

1.06 ASHRAE COMPLAINCE

A. The unit components and controls shall comply with following ASHRAE 90.1, 2007 requirements:

1. Dead Band ASHRAE 90.1 Sec 6.4.3.1.2
2. Setpoint Overlap Restriction ASHRAE 90.1 Sec 6.4.3. 2
3. Maximum Damper Leakage Sec 6.5.2.3

1.07 DELIVERY, STORAGE, AND HANDLING

A. Unit shall be shipped with doors bolted shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.

B. Follow Installation, Operation and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.

C. Unit shall be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation and Maintenance manual.

1.08 WARRANTY

A. Manufacturer shall provide a "parts only" warranty for a period of 12 months from the date of equipment startup or 18 months from the date of shipment, whichever is

less. Warranty shall cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer's written instructions for installation, operation and maintenance have been followed. Warranty excludes parts associated with routine maintenance, such as belts and air filters.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Products shall be provided by the following manufacturers:

1. AAON (basis of design)
2. Carrier
3. Trane

B. AAON is the basis of design. All equipment considered for approval shall include at a minimum:

a. R-410A refrigerant

b. Direct drive supply fans

c. Double wall cabinet construction

d. Insulation with a minimum R-value of 13

e. Stainless steel drain pans

f. Hinged access doors with lockable handles

g. Variable capacity compressor (digital scroll compressor) with 10-100% capacity modulation

h. High efficiency filtration, MERV 13 minimum.

i. Overall unit dimensions not to exceed those indicated on plans

j. All other provisions of the specifications must be satisfactorily addressed

2.02 ROOFTOP UNITS

A. General Description

1. Packaged rooftop unit shall include compressors, evaporator coils, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, reheat coil, indirect gas fired furnace , exhaust fans, return fans, energy recovery wheels, and unit controls.
2. Unit shall be factory assembled and tested including leak testing of the coils, pressure testing of the refrigeration circuit, and run testing

of the completed unit. Run test report shall be supplied with the unit in the controls compartment's literature pocket.

3. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.

4. Unit components shall be labeled, including pipe stub outs, refrigeration system components and electrical and controls components.

5. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.

6. Installation, Operation and Maintenance manual shall be supplied within the unit.

7. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's access door.

8. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's access door.

B. Construction

1. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.

2. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D-1929 for a minimum flash ignition temperature of 610°F.

3. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break with no metal path from inside to outside the cabinet. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel, and prevents exterior condensation on the panel.

4. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Refrigerant piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.

5. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.

6. Access to filters, dampers, cooling coils, reheat coil, heaters, supply fans, exhaust fans, return fans, energy recovery wheels, compressors, water-cooled condensers, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.
7. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
8. Units with cooling coils shall include double sloped 304 stainless steel drain pans.
9. Unit shall be provided with base discharge and return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.
10. Unit shall include lifting lugs on the top of the unit.

C. Electrical

1. Unit shall be provided with factory installed and factory wired 115V, 13 amp GFI outlet with outlet disconnect switch in the unit control panel.
2. Unit shall be provided with phase and brown out protection which shuts down all motors in the unit if the electrical phases are more that 10% out of balance on voltage, the voltage is more that 10% under design voltage, or on phase reversal.

D. Supply Fans

1. Unit shall include direct drive, un-housed, backward curved, plenum supply fans.
2. Blowers and motors shall be dynamically balanced and mounted on rubber isolators.
3. Motors shall be standard (premium) efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
4. Motors shaft shall have grounding for shaft voltage mitigation to prevent damage to bearings.
5. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.

E. Exhaust Fans

1. Exhaust dampers shall be sized for 100% relief.
2. Fans and motors shall be dynamically balanced.
3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.

1. Motors shaft shall have grounding for shaft voltage mitigation to prevent damage to bearings.
2. Motors shaft shall have grounding for shaft voltage mitigation to prevent damage to bearings.
3. Access to exhaust fans shall be through double wall, hinged access doors with quarter turn handles.
4. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.

F. Cooling Coils

1. Evaporator Coils

a. Coils shall be designed for use with R-410A refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.

b. Coils shall have interlaced circuitry and shall be 6-row high capacity.

c. Coils shall be helium leak tested.

d. Coils shall be furnished with a factory installed thermostatic expansion valves.

G. Refrigeration System

1. Unit shall be factory charged with R-410A refrigerant.
2. Compressors shall be scroll type with thermal overload protection, independently circuited, and carry a five year non-prorated warranty.
3. Compressors shall be mounted in an isolated service compartment which can be accessed without affecting unit operation. Lockable hinged compressor access doors shall be fabricated of double wall, rigid polyurethane foam insulated panels to prevent the transmission of noise outside the cabinet.
4. Compressors shall be isolated from the base pan with the compressor manufacturer's recommended rubber vibration isolators, to reduce any transmission of noise from the compressors into the building area.
5. Each refrigeration circuit shall be equipped with thermostatic expansion valve type refrigerant flow control.
6. Each refrigeration circuit shall be equipped with automatic reset low pressure and manual reset high pressure refrigerant safety controls, Schrader type service fittings on both the high pressure and low pressure sides, and factory installed liquid line filter driers.
7. Unit shall include (2) stages of capacity control.

8. Unit shall include a variable capacity scroll compressor on the lead (all) refrigeration circuit(s) which shall be capable of modulation from 10-100% of its capacity.

9. Lead refrigeration circuit(s) shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a dehumidification control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.

10. First capacity stage shall be provided with on/off condenser fan cycling and adjustable compressor lockout to allow cooling operation down to 35°F.

H. Condensers

1. Air-Cooled Condenser

a. Condenser fans shall be vertical discharge, axial flow, direct drive fans.

b. Coils shall be designed for use with R-410A refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and aluminum end casings. Fin design shall be sine wave rippled.

c. Coils shall be designed for a minimum of 10°F of refrigerant sub-cooling.

d. Coils shall be helium leak tested.

I. Gas Heating

1. Stainless steel heat exchanger furnace shall carry a (25) year non-prorated warranty.

2. Gas furnace shall consist of (stainless) steel heat exchangers with multiple concavities, an induced draft blower and an electronic pressure switch to lockout the gas valve until the combustion chamber is purged and combustion airflow is established.

3. Furnace shall include a gas ignition system consisting of an electronic igniter to a pilot system, which will be continuous when the heater is operating, but will shut off the pilot when heating is not required.

4. Unit shall include a single gas connection and have gas supply piping entrances in the unit base for through-the-curb gas piping and in the outside cabinet wall for across the roof gas piping.

5. Natural gas furnace shall be equipped with modulating gas valves, adjustable speed combustion blowers, stainless steel tubular heat exchangers, and electronic controller. Combustion blowers and gas valves shall be capable of modulation. Electronic controller includes

a factory wired, field installed supply air temperature sensor. Sensor shall be field installed in the supply air ductwork. Supply air temperature setpoint shall be adjustable on the electronic controller within the controls compartment, 210 MBtu/h, 270 MBtu/h, 292.5 MBtu/h and 390 MBtu/h gas heating assemblies shall be capable of operating at any firing rate between 100% and 30% of their rated capacity.

J. Filters Grilles

1. Unit shall include 2 inch thick, pleated panel filters with an ASHRAE efficiency of (85%) and a MERV rating of (13), upstream of the cooling coil. Unit shall also include 2 inch thick, pleated panel pre-filters with an ASHRAE efficiency of 30% and MERV rating of 7, upstream of the 4 inch standard filters.
2. Unit shall include a clogged filter switch.

K. Energy Recovery (wheel shall be non-dessicant type)

1. Wheel shall be molecular sieve wheel utilizing a 3Å molecular sieve desiccant coating to limit the risk of desiccant cross-contamination which would otherwise cause a portion of the exhaust air pollutants to be transferred, along with the water vapor, to the fresh air stream.
2. Unit shall contain a factory mounted and tested energy recovery wheel(s). The energy recovery wheel(s) shall be mounted in a rigid frame containing the wheel drive motor, drive belt, wheel seals and bearings. Frame shall slide out for service and removal from the cabinet.
3. The energy recovery component shall incorporate a rotary wheel in an insulated cassette frame complete with seals, drive motor and drive belt.
4. Wheels shall be wound continuously with one flat and one structured layer in an ideal parallel plate geometry providing laminar flow and minimum pressure drop-to-efficiency ratios. The layers shall be effectively captured in stainless steel wheel frames or aluminum and stainless steel segment frames that provide a rigid and self-supporting matrix.
5. Wheels shall be provided with removable energy transfer matrix. Wheel frame construction shall be a welded hub, spoke and rim assembly of stainless, plated and/or coated steel and shall be self-supporting without matrix segments in place. Segments shall be removable without the use of tools to facilitate maintenance and cleaning. Wheel bearings shall be selected to provide an L-10 life in excess of 400,000 hours. Rim shall be continuous rolled stainless steel and the wheel shall be connected to the shaft by means of taper locks.
6. All diameter and perimeter seals shall be provided as part of the cassette assembly and shall be factory set. Drive belts of stretch

urethane shall be provided for wheel rim drive without the need for external tensioners or adjustment.

7. The energy recovery cassette shall be an Underwriters Laboratories Recognized Component for electrical and fire safety. The wheel drive motor shall be an Underwriters Laboratory Recognized Component and shall be mounted in the cassette frame and supplied with a service connector or junction box. Thermal performance shall be certified by the manufacturer in accordance with ASHRAE Standard 84, Method of Testing Air-to-Air Heat Exchangers and AHRI Standard 1060, Rating Air-to-Air Energy Recovery Ventilation Equipment. Cassettes shall be listed in the AHRI Certified Products.

8. Incorporate bypass dampers on intake and exhaust air stream of the wheel.

9. Energy recovery wheel cassette shall carry a 5 year non-prorated warranty.

10. Unit shall include 2 inch thick, pleated panel outside air and exhaust pre-filter and final filters air filters with an MERV rating of 7 and 13 respectively upstream of the wheels.

11. Hinged service access door shall allow access to the wheel(s).

12. Unit shall include energy recovery wheel defrost control which includes an adjustable temperature sensor and timer wired to periodically stop the wheel rotation, which allows the warm exhaust air to defrost the wheel.

13. Unit shall include energy recovery wheel rotation detection sensors and a set of normally open and normally closed contracts for field indication of wheel rotation.

L. Controls: Factory Installed and Factory Provided Controller

1. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested.

2. Controller shall be capable of stand alone operation with unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.

3. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.

4. Controller shall include non-volatile memory to retain all programmed values, without the use of an external battery, in the event of a power failure.

5. With modulating gas heat option, a field installed supply air temperature sensor shall be furnished to control the amount of heating. Supply air temperature setpoint shall be field adjustable.

6. With enthalpy activated fully modulating economizer option, an outdoor air humidity sensor shall be factory installed.

7. With the modulating hot gas reheat option a space humidity sensor and supply air temperature sensor shall be furnished with the unit for field installation. Suction pressure sensor shall be factory installed. Supply air temperature and space humidity set-points, for the dehumidification mode of operation, shall be adjustable.

8. Unit shall be equipped with hot gas bypass on the lead (and lag) refrigeration circuits to protect against evaporator frosting at low suction pressures and to prevent excessive compressor cycling.

9. Outside air temperature sensor shall be factory mounted and wired. Supply air temperature sensor shall be furnished with the unit for field installation.

M. Control Sequence: The factory built unit control shall provide for following sequence of operation for the rooftop units.

1. Occupied Mode - All unit functions will be enabled for normal heating, cooling and dehumidification operation.

2. Occupied Space Temperature Control - When in occupied mode as described above, the dedicated unit control shall operate stages of heating and cooling to maintain space temperature setpoint. Set-points may be set by one of the following methods:

   a. Locally through the remote unit controller by the occupant within programmed limits.

3. Dehumidification Mode: The unit shall automatically sequence cooling, hot gas reheat and heating to maintain humidity setpoint.

4. Fire Shutdown - The unit will shut down in response to a contact closure to fire alarm panel indicating the presence of smoke or fire condition.

5. Manual Setting of Heat or Cool Mode - The operator shall be able to select the following unit operating modes:

   a. Heating

   b. Cooling

6. Default mode shall be automatic changeover.

7. Active space temperature and humidity shall be calculated by the Rooftop Unit Controller by duct mounted temperature sensors in return air stream for RTU-1, 2.

8. Active space temperature and humidity shall be calculated by the Rooftop Unit Controller by space mounted and humidity temperature sensor located on plans for RTU-3.

9. Heat Cool Mode- The Heat Cool mode can be set by a communicated value or automatically by the Rooftop Unit

Controller (RTUC). In standalone or auto mode the RTUC shall automatically determine the Heat Cool mode by integrating over time between the active setpoint and the average space temperature.

10. Heat Cool Set-point- The space temperature setpoint shall be determined either by a local hardwired setpoint, the RTUC default setpoint or a communicated value. The RTUC uses the locally stored default set-points when neither a local hardwired setpoint nor a communicated setpoint is present. If both a hardwired setpoint and communicated setpoint exist, the RTUC shall use the communicated value.

11. Cooling and Dehumidification Operation - When the unit is in cooling mode, the RTUC shall maintain the average space temperature at the active cooling setpoint. Unit shall cycle stages of DX cooling and Hot Gas bypass un-loader and reheat to maintain temperature and humidity setpoint. Based on the RTUC occupancy mode, the active cooling setpoint shall be one of the following:

Setpoint	Default Value
Cooling	Setpoint: 76° ±3°F DB / RH 45±5%

12. Heating Operation - When the unit is in heating mode, the RTUC shall maintain the average space temperature at the active heating setpoint. Based on the RTUC occupancy mode, the active heating setpoint shall be one of the following:

Setpoint	Default Value
Heating	Setpoint: 70°±3°F

13. Deadband and Overlap Restriction: The controller shall be capable of providing at least 5 degree dead band within which the supply of heating and cooling is shut-off or reduced. The program shall prevent heating set-point from exceeding the cooling set-point minus the dead band to comply with ASHRAE 90.1, 2007 requirements.

14. Fan Operation - The supply and return fan shall be configurable to operate continuously. Supply fan variable frequency drive shall modulate supply fan to maintain supply duct static pressure setpoint to compensate for filter loading. Return fan VFD shall be modulate return fan to maintain programmed offset.

15. Outside Air Damper Control - Outside air damper shall remain open.

16. Supply Air Tempering - When the unit is in the heat mode, but not actively heating, if the supply air temperature drops 10 degrees or more below the heating set point, heat is turned on until supply air temperature rises to a point 10 degrees above the heating setpoint.

17. Economizer Preferred Cooling - Compressor operation is integrated with economizer cycle to allow mechanical cooling when economizer is not adequate to satisfy zone requirements or space humidity exceeds setpoint conditions. . Compressors are enabled if

space temperature is recovering to cooling setpoint at a rate of less than 0.2 degrees per minute.

18. Diagnostic/Protection - The BAS system shall be able to alarm from all sensed points from the rooftop units and diagnostic alarms sensed by the unit controller. Alarm limits shall be designated for all sensed points.

N. Accessories

1. Unit shall be provided with a smoke detector factory wired to shut-down unit upon detection of smoke condition.

2. Provide double wall insulated heavy gauge roof curb, minimum 27 inches high above finished roof surface plus roof insulation thickness above deck with built in supply and return plenum with horizontal (side wall) supply and return openings and separation wall between roof curb supply plenums. The roof curb shall be heavy gauge G90 galvanized steel construction.

PART 3 - EXECUTION

3.01 INSTALLATION, OPERATION, AND MAINTENANCE

A. Installation, Operation and Maintenance manual shall be supplied with the unit.

B. Installing contractor shall install unit, including field installed components, in accordance with Installation, Operation and Maintenance manual instructions.

C. Start up and maintenance requirements shall be complied with to ensure safe and correct operation of the unit.

END OF SECTION

SECTION 237435
SURGERY ROOM AIR CONDITIONING UNIT

PART 1 – GENERAL

1.1 DESCRIPTION

A. These specifications describe requirements for an environmental control system. The system shall be designed to maintain temperature and relative humidity conditions within the room.

B. The manufacturer shall design and furnish all equipment to be fully compatible with heat dissipation requirements of the site.

C. System shall be supplied with E.T.L. (CSA if applicable) listings.

D. The environmental control system shall be a factory assembled unit. The refrigeration system shall be split, with the compressor located in a (remote) (close coupled) condensing unit. The evaporator section shall be specifically designed for floor – or wall-mounted installation and serviceable from the front of the system. Condensing units shall be designed for outdoor installation.

1.2 SUBMITTALS

A. Submittals shall be provided and shall include: Single-Line Diagrams; Dimensional, Electrical and Capacity Data; Pining and Electrical Connection Drawings.

1.3 QUALITY ASSURANCE

A. The specified system shall be factory-tested before shipment. Testing shall include, but shall not be limited to: Quality Control Checks, "Hi-Pot" Test (two times rated voltage plus 1000 volts, per UL requirements), and Metering Calibration Tests.

PART 2 – PRODUCT

2.1 ACCEPTABLE MANUFACTURER

A. Liebert

B. Airflow.

C. Hiross

2.2 STANDARD FEATURES

A. Evaporator Cabinet and Frame Construction: The cabinet and chassis shall be constructed of heavy gauge, furniture steel. Exterior panels shall be powder coated. The cabinet shall be designed for easy installation and service from the front only.

B. Air Distribution

1. The air distribution system shall be constructed with a quiet, direct-drive fan assembly equipped with multiple double-inlet blowers, self-aligning sleeve bearings, and lifetime lubrication. Fan motor shall be permanent-split capacitor, high efficiency type, equipped with two speeds for air flow modulation. Dehumidification shall utilize the lower fan speed.

2. Air filters shall be the pleated panel filters, MERV 13 rating when tested per ASHRAE 52.2. They shall be easily removable from the front of the system by means of quarter-turn fasteners and shall not require system shutdown for service

C. Microprocessor Control System: The microprocessor based integral control system shall be factory assembled, wired into the system cabinet and tested prior to shipment. Controls shall be easily accessible from the front of the system. The controls shall include an LCD custom display providing a continuous display of operating status and alarm condition. An 8-key membrane keypad for setpoint/ program control, unit on/off and fan speed shall be located below the display.

1. Monitoring: The LCD display shall provide an on/off indication, fan speed indication, operating mode indication (cooling, heating, humidifying, dehumidifying) and current day, time, temperature and humidity (if applicable) indication. The monitoring system shall be capable of relaying unit operating parameters and alarms to a site monitoring system or building DDC system.

2. Control Parameters:

a. The control shall have two temperature control setpoints for cooling and heating functions with a minimum 2°F differential between them. The control shall automatically switch from cooling to heating modes based on return air conditions. The temperature control setpoint range shall be 60°F to 85°F (15.6°C to 29.4°C).

b. On units with humidity control: The control shall have two humidity control setpoints for humidification and dehumidification functions with a minimum 4% RH differential between them. The control shall automatically switch from humidifying based on return air conditions.

c. The humidity control setpoint range shall be 20% RH to 80% RH.

3. Programmability:

   a. The control shall be programmable on a daily basis or on a 5 day/2 day program schedule. It shall be capable of accepting 2 programs per day.

   b. The unit shall be interlocked with inlet damper supplying pre-conditioned air to the unit. A airflow switch shall confirm inlet airflow prior to energizing the unit.

   c. The control shall include the capabilities to calibrate the temperature and humidity sensors and adjust the sensor response delay time from 10 to 90 seconds.

   d. The control shall be capable of displaying temperature valves in °F or °C.

4. Alarms:

   a. The control system shall monitor unit operation and activate an audible and visual alarm for the following field adjustable conditions.

      (1) High Temperature (max 90°F, 32.2°C)

      (2) Low Temperature (min 35°F, 1.7°C)

      (3) High Humidity (max 85% RH)

      (4) Low Humidity (min15% RH)

   b. The control shall be capable of disabling any alarm if required.

5. System Auto Restart: The auto restart feature shall automatically restart the unit after a power failure.

D. Electric Reheat: The electric reheats shall be low-watt density, tubular elements and shall include agency approved safety switches to protect the system from overheating.

E. Direct Expansion Coil: The evaporator coil shall be constructed of copper tubes and aluminum fins. Refrigerant flow shall be controlled by an externally equalized thermostatic expansion valve. The coil shall be provided with a stainless steel drain pan.

F. Refrigeration System: The refrigeration system shall consist of a hermetic compressor with vibration isolating springs, high pressure safety switch, liquid line filter/drier and a compressor crankcase heater. Refrigeration components shall be located in the condensing unit.

G. Condensing Unit:

1. Air Cooled: The air cooled system shall consist of an evaporator section and a condensing unit section. The roof mounted condensing section shall be as constructed as follows:

   a. The condenser coil shall be constructed of copper tubes and aluminum fins with a direct-drive propeller-type fan.

   b. All components shall be factory assembled, charge with refrigerant, sealed and be capable of being connected to the evaporator section using pre-charged refrigerant line sets. No piping, brazing dehydration or charging shall be required. Condenser shall be designed for 115°F ambient and be capable of operation to -30°F.

2. Accessories (Roof Supports): Provide insulated roof supports for condensing unit. Welded 18 gauge galvanized steel shell, base plate and counter flashing, factory installed wood nailer (2 x 4 or 2 x 6 Standard), fully mitered end sections, internal bulkhead reinforcement, height as indicated on plans, minimum 18 inches above finished roof.

H. Additional Equipment

1. Refrigerant Line Sets: Pre-charged refrigerant line sets shall be provided by the manufacturer in proper lengths for application.

2. Steam-Generating Humidifier:

   a. Provide electronically controlled steam-generating humidifier factory piped, mounted and wired to the integral control system. The steam generator shall provide dry steam to the bypass air around the evaporator coil.

   b. Controls for the humidification system shall include: High and low humidity setpoints, automatic water feed and drain valves.

3. Site Monitoring System: A Site Monitoring System shall be provided for remote monitoring of the units and monitoring of other support equipment.

4. Site Monitoring or Control Systems: Provide indicated quantities of the following:

   a. Leak Detection System(s)

   b. Remote Monitor(s)

   c. Auto-changeover Control(s)

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Install in accordance with manufacturer's installation instructions. Install unit plumb and level, firmly anchored in location indicated and maintain manufacturer's recommended clearances.

B. Electrical Wiring: Install and connect electrical devices furnished by manufacturer, but not specified to be factory mounted. Furnish copy of manufacturer's electrical connection diagram submittal to electrical contractor.

C. Piping Connections: Install and correct devices furnished by manufacturer, but not specified to be factory mounted. Furnish copy of manufacturer's piping connection diagram submittal to piping contractor.

D. Supply and Drain Water Piping: Connect water supply and drains to air conditioning unit. Provide pitch and trap as manufacturer's instructions and local codes require.

E. Start Up: Start up air conditioning unit in accordance with manufacturer's start up instructions. Test controls and demonstrate compliance with requirements.

END OF SECTION

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SECTION 238126

VARIABLE REFRIGERANT FLOW ZONING SPLIT SYSTEM

PART 1– GENERAL

1.01 GENERAL REQUIREMENTS

A. Related Work Specified Elsewhere

1. General Conditions – Section 01 0000
2. Basic Mechanical Requirements – Section 23 0500

1.02 SYSTEM DESCRIPTION

A. The variable capacity, heat pump heat recovery air conditioning system shall be a VRFZ Variable Refrigerant Flow Zoning System. The system shall be the designed for simultaneous cooling and heating split system heat pump.

B. The system shall consist of an outdoor heat pump condensing unit, Branch Circuit (BC) Controller(s) as appropriate, multiple indoor units and Direct Digital Controls. The outdoor unit shall be a vertical discharge, 208/230 volt, three phase unit.

1.03 QUALITY ASSURANCE

A. The units shall be listed by Electrical Laboratories (ETL) and bear the ETL label.

B. All wiring shall be in accordance with the National Electrical Code (N.E.C.).

C. The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

D. A full charge of R-410A for the condensing unit only shall be provided in the condensing unit.

1.04 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled according to the manufacturer's recommendation.

1.05 WARRANTY

A. The units shall be covered by the manufacturer's limited warranty for a period of one (1) year from date of installation. In addition the compressor shall have a manufacturer's limited warranty for a period of six (6) years from date of installation.

B. If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer.

C. This warranty shall not include labor.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Mitsubishi (basis of design)

B. Daikin

C. Sanyo

2.02 OUTDOOR UNIT

A. General: The system shall consist of the outdoor unit, Branch Circuit (BC) Controller, indoor units, and Direct Digital Controls system control. The outdoor units shall be equipped with multiple circuit boards that interface to the controls system and shall perform all functions necessary for operation. The outdoor unit shall have a powder coated finish. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.

1. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of outdoor rated capacity.
2. Outdoor unit shall have a sound rating no higher than 63 dB(A).
3. Both refrigerant lines from the outdoor unit to the BC (Branch Circuit) Controller (Single or Main) shall be separately insulated.
4. The outdoor unit shall have an accumulator with refrigerant level sensors and controls.
5. The outdoor unit shall have a high pressure safety switch, over-current protection and DC bus protection.
6. The outdoor unit shall have the ability to operate with a maximum height difference of 164 feet and have total refrigerant tubing length of 984-1312 feet. The greatest length is not to exceed 492 feet between outdoor unit and the indoor units without the need for line size changes or traps.
7. The outdoor unit shall be capable of operating in heating down to -4°F ambient temperatures without additional low ambient controls.
8. The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.

B. Unit Cabinet:

1. The casing(s) shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

C. Fan:

1. The outdoor unit shall be furnished with one direct drive, variable speed

propeller type fan.

2. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.

3. All fan motors shall be mounted for quiet operation.

4. All fans shall be provided with a raised guard to prevent contact with moving parts.

5. The outdoor unit shall have vertical discharge airflow.

D. Refrigerant

1. R410A refrigerant shall be required for outdoor unit systems.

E. Coil:

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.

2. The coil fins shall have a factory applied corrosion resistant blue-fin finish.

3. The coil shall be protected with an integral metal guard.

4. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.

5. The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.

F. Compressor:

1. The outdoor units shall be equipped with one inverter driven scroll hermetic compressor.

2. A crankcase heater(s) shall be factory mounted on the compressor(s).

3. The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable down to 16% of rated capacity.

4. The compressor will be equipped with an internal thermal overload.

5. The compressor shall be mounted to avoid the transmission of vibration.

G. Electrical:

1. The outdoor unit electrical power shall be 208/230 volts, 3-phase, 60 hertz.

2. The outdoor unit shall be controlled by integral microprocessors.

3. The control circuit between the indoor units, BC Controller and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

2.03 BRANCH CIRCUIT (BC) CONTROLLERS

A. General:

1. The BC (Branch Circuit) Controllers shall be equipped with a circuit board

that interfaces to the controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish. The BC Controller shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory. This unit shall be mounted indoors. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of rated capacity.

B. BC Unit Cabinet:

1. The casing shall be fabricated of galvanized steel.
2. Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves.
3. The unit shall house two tube-in-tube heat exchangers.

C. Refrigerant

1. R410A refrigerant shall be required for BC Controllers in conjunction with outdoor unit systems.

D. Refrigerant valves:

1. The unit shall be furnished with multiple two position refrigerant valves.
2. Each circuit shall have one (54,000 Btu/h or smaller indoor unit section) two-position liquid line valve and a two-position suction line valve.
3. When connecting a 54,000 Btu/h or larger indoor unit section, two branch circuits shall be joined together at the branch controller to deliver an appropriate amount of refrigerant. The two refrigerant valves shall operate simultaneously.
4. Linear electronic expansion valves shall be used to control the variable refrigerant flow.

E. Integral Drain Pan:

1. An integral condensate pan and drain shall be provided.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
2. The BC Controller shall be controlled by integral microprocessors.
3. The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

2.04 WALL-MOUNTED INDOOR UNIT

A. General:

1. The PKFY shall be wall-mounted indoor unit section with a slim silhouette and shall have a modulating linear expansion device. The PKFY shall

support individual control using M-NET direct digital controllers.

B. Indoor Unit

1. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

C. Unit Cabinet:

1. The casing shall have a white finish.
2. Multi directional drain and refrigerant piping offering four (4) directions for refrigerant piping and two (2) directions for draining shall be standard.
3. There shall be a separate back plate which secures the unit firmly to the wall.

D. Fan:

1. The indoor fan shall be an assembly with one or two line-flow fan(s) direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. A manual adjustable guide vane shall be provided with the ability to change the airflow from side to side (left to right).
4. A motorized air sweep louver shall provide an automatic change in airflow by directing the air up and down to provide uniform air distribution.

E. Filter:

1. Return air shall be filtered by means of an easily removable, washable filter.

F. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. All tube joints shall be brazed with phos-copper or silver alloy.
4. The coils shall be pressure tested at the factory.
5. A condensate pan and drain shall be provided under the coil.
6. Both refrigerant lines to the PKFY indoor units shall be insulated.

G. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.

H. Controls:

1. This unit shall use controls provided by unit manufacturer to perform functions necessary to operate the system. Please refer to Control Section of this specification for details on control system.

2.05 HIGH STATIC, CEILING-CONCEALED DUCTED INDOOR UNIT

A. General:

1. The unit shall be a high-performance ceiling concealed ducted indoor fan coil that mounts above the ceiling with a fixed rear return and a horizontal discharge supply, and shall have a modulating linear expansion device. The unit shall feature external static pressure settings up 0.80 in. WG.

B. Indoor Unit.

1. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

C. Unit Cabinet:

1. The cabinet shall be ceiling-concealed, ducted.
2. The cabinet panel shall have provisions for a field installed filtered outside air intake.

D. Fan:

1. The indoor unit fan shall be an assembly with one or two Sirocco fan(s) direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor unit shall have a ducted air outlet system and ducted return air system.

E. Filter:

1. Provide rear return filter box with long-life filter shall available for all indoor units.

F. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. All tube joints shall be brazed with phos-copper or silver alloy.

4. The coils shall be pressure tested at the factory.
5. A condensate pan and drain shall be provided under the coil.
6. The condensate shall be gravity drained from the fan coil.
7. Both refrigerant lines to the PEFY indoor units shall be insulated.

G. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz

H. Controls:

1. This unit shall use controls provided by manufactuer to perform functions necessary to operate the system. Please refer to Part 5 of this guide specification for details on controllers and other control options.

2.06 CONTROLS

A. General:

1. The manufacturer's controls network (MCN) shall be capable of supporting remote controllers, schedule timers, system controllers, centralized controllers, an integrated web based interface, graphical user workstation, and system integration to Building Management Systems via BACnet and LonWorks.
2. The MCN shall operate at 24VDC. Controller power and communications shall be via a common non-polar communications bus.
3. Control wiring shall be installed in a system daisy chain configuration from indoor unit to manufacturer's furnished remote controller to indoor unit, to the BC controller (main and subs, if applicable) and to the outdoor unit. Control wiring to remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit.
4. Control wiring for schedule timers, system controllers, and centralized controllers shall be installed in a daisy chain configuration from outdoor unit to outdoor unit, to system controllers, to the power supply.
5. The centralized system controller shall be capable of being networked with other system controllers for web based control.

B. Wiring type:

1. Wiring shall be 2-conductor (16 AWG or 18 AWG), twisted shielded pair, stranded wire.
2. Network wiring shall be CAT-5e with RJ-45 connection.

C. Controls Network

1. The Controls Network shall consists of a centralized controller, and integrated web based interface communicating over a high-speed communication bus. The Controls Network shall support operation monitoring, scheduling, error email distribution, personal browsers, online

maintenance support, and allow integration with Building Management Systems (BMS) using either LonWorks or BACnet interfaces..

D. Centralized Controller

1. The G-50A Centralized Controller shall be capable of controlling a maximum of 50 indoor units across multiple outdoor units. The Centralized Controller shall be powered from a manufacturer's Power Supply Unit. The Centralized Controller shall support operation superseding that of the remote controllers, system configuration, daily/weekly scheduling, monitoring of operation status, and malfunction monitoring. The Centralized Controller shall have five basic operation controls which can be applied to an individual indoor unit, or all indoor units (collective batch operation). This basic control set of operation controls for the Centralized Controller shall include on/off, operation mode selection (cool, heat, auto, temperature setting, fan speed setting, and airflow direction setting. The centralized controller shall be able to enable or disable operation of local remote controllers. In terms of scheduling, the Centralized Controller shall allow the user to define both daily and weekly schedules with operations consisting of ON/OFF, mode selection, temperature setting, and permit/prohibit of remote controllers.

Centralized Controller			
Item	**Description**	**Operation**	**Display**
ON/OFF	Run and stop operation for a single group	Each Group or Collective	Each Group or Collective
Operation Mode	Switches between Cool/Dry/Auto/Fan/Heat. (Group of Lossnay unit: automatic ventilation/vent-heat/interchange/normal ventilation) Operation modes vary depending on the air conditioner unit. Auto mode is in the CITY MULTI R2-Series only.	Each Group or Collective	Each Group
Temperature Setting	Sets the temperature for a single group. Range of temperature setting: Cool/Dry: 57°F-87°F Heat: 63°F-83°F Auto: 67°F-83°	Each Group or Collective	Each Group
Fan Speed Setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low	Each Group or Collective	Each Group
Timer Operation	Start/Stop and Enable/Disable can be set 3 times in one day. For a week's schedule, store three start/stop patterns and one enable/disable pattern. *2 When the timer is set, "Timer Enabled" is shown on the operation setting screen of the LCD.	Each Group or Collective	*2 Each Group

Centralized Controller			
Item	**Description**	**Operation**	**Display**
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). *3: Centrally Controlled is displayed on the remote controller for prohibited functions.	Each Group or Collective	*3 Each Group
Display Indoor Unit Intake Temp	Measures and displays the intake temperature of the indoor unit when the indoor unit is operating.	N/A	Each Group
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed *4 When an error occurs, the LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection	N/A	*4 Each Unit or Collective
Test Run	Operates air conditioner units in test run mode.	Each Group	Each Group
Ventilation Equipment	This interlocked system settings can be performed by the master system controller. When setting the interlocked system, use the ventilation switch the free plan LOSSNAY settings between "Hi", "Low" and "Stop". When setting a group of only free plan LOSSNAY units, you can switch between "Normal ventilation", "Interchange ventilation" and "Automatic ventilation".	Each Group	Each Group
External Input / Output	By using accessory cables you can set and monitor the following. Input By level: "Batch start/stop", "Batch emergency stop" By pulse: "batch start/stop", "Enable/disable remote controller" Output: "start/stop", "error/Normal"	*5 Collective	*5 Collective

2. All Centralized Controllers shall be equipped with one RJ-45 Ethernet port to support interconnection with a network PC via a closed/direct Local Area Network (LAN).

3. The Centralized Controller shall be capable of performing initial settings via the keypad and display on the controller or via a PC using the Centralized Controller's initial setting browser.

4. Software functions shall be available so that the building manager can securely log into central controller via the PC's web browser to support operation monitoring, scheduling, error email, personal browser for PCs and MACs, and online maintenance diagnostics.

E. Web-based User Interface:

1. Licenses per function, per central controller shall be provided.
2. PC-Monitoring (SW-Mon): The MCN shall be capable of monitoring and operating all indoor units from a networked PC's web browser for up to 50 units per centralized controller.
3. PC Scheduling (SW-Sch): The MCN shall be capable of creating customized daily, weekly, and annual schedules from a network PC's web browser for up to 50 units per controller. Schedules shall be applied to a single indoor unit, a group of indoor units, or collectively (batch) to all indoor units controlled by the respective centrlazied controller.
4. Online Error Email (SW-Email): The MCN shall be capable of sending detailed alerts to customizable distribution lists based on user defined error types.
5. Personal Web Browser (SW-Pweb): The MCN shall be capable of allowing up to 50 individual users to monitor and control user defined zones via a network PC or MAC's web browser.
6. Online Maintenance Diagnostics (SW-Maintenance): The CMCN shall be capable of performing maintenance diagnostics via a network PC and G-50A/GB-50A centralized controller using Maintenance Tool Software.

F. Power Supply

1. The power supply shall supply 12VDC (TB 3) for the centralized controller and 24VDC voltage for the central control transmission. Provide one for each controller.

2.07 ACCESSORIES (ROOF SUPPORT)

1. Accessories (Roof Supports): Provide roof supports for condensing unit. Welded 18 gauge galvanized steel shell, base plate and counter flashing, factory installed wood nailer (2 x 4 or 2 x 6 Standard), fully mitered end sections, internal bulkhead reinforcement, height as indicated on plans, minimum 18 inches above finished roof.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine units before installation. Reject that are wet, moisture damaged, or damaged.

3.02 PREPARATION

A. Comply with manufacturer's handling, storage and installation instructions.
B. Outdoor Unit Mounting: Install outdoor unit on equipment or concrete base using resilient hold down assembly.

C. Install continuous-thread hanger rods and elastomeric hangers of size required to support indoor unit weights.

1. Comply with requirements for vibration isolation devices specified in Division 23 Section "Vibration Controls for HVAC Piping and Equipment." Fabricate brackets or supports as required.
2. Comply with requirements for hangers and supports specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

3.03 CONNECTIONS

A. Comply with requirements for piping specified in Division 23 Section 233000. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to machine to allow service and maintenance.

3.04 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.05 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Run test heating and cooling modes.

3.06 ADJUSTING

A. Adjust units to function smoothly, program centralized controller and and test functionality of BMS integration and user interface.

3.07 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain the system.

END OF SECTION

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SECTION 238200
HEATING TERMINAL UNITS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide labor, materials, equipment and services, and perform operations required for complete installation of the terminal units and related work as indicated on the drawings or specified herein.

B. Related Work Specified Elsewhere
   1. General Conditions – Section 01000
   2. Basic Mechanical Requirements – Section 230500

Work Included: The work shall include, but not be limited to, the following:

1. Cabinet Heater
2. Unit Heater
3. Wall Mount Heater

1.02 QUALITY ASSURANCE

A. Material and installation shall comply with the latest edition of application codes, recommended practices, and standards of NEC, NEMA and U.L.

1.03 SUBMITTALS

A. Submit the following in accordance with the requirements specified under Submittals in Section 23 0500.

1. Product Data

   a. Submit copies of manufacturer's latest published literature for materials specified herein for approval, and obtain approval before materials are delivered to the site.

   b. Data shall include manufacturer's specifications for terminal units showing dimensions, capacities, ratings, performance characteristics, gauges and finishes of materials, and installation instructions.

2. Shop Drawings: Shop drawings for work specified herein shall be submitted for approval. Shop drawings shall show assembly-type drawings showing unit dimensions, construction details, and field connection details.

3. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to terminal units. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of factory-installed and field-installed wiring.

4. Samples: Submit 3 samples for each type of cabinet finish furnished.

5. Maintenance Data: Submit maintenance instructions, including lubrication instructions, filter replacement, motor and drive replacement, and spare parts lists. Include this data, product data, and shop drawings in maintenance manuals in accordance with General Conditions requirements as applicable.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and handle as to prevent the inclusion of foreign materials and the damage of breaking, denting and scoring. Do not install damaged terminal units or components; replace with new.

B. Store materials and equipment where designated. Protect from weather, dirt, fumes, water, construction debris, and physical damage. Contractor shall assume responsibility and security for materials and equipment. Take precautions for protection from detrimental conditions.

C. Comply with Manufacturer's rigging and installation instructions for unloading terminal units, and moving them to final location.

PART 2 - PRODUCTS

2.01 CEILING MOUNT HEATERS

A. The heating equipment shall include an electric, ceiling-mounted type CDF, fan-forced air heater suitable for large area heating as manufactured by QMark, Berko, Marley or approved equal. The heater shall be UL Listed. The heater shall be designed for surface, recess or T-Bar mounting. The heaters shall be factory wired for single-phase operation and field convertible to three phase operation by removing one jumper wire, and relocating one wire. The heaters should be factory wired for full wattage and field convertible to 75% or 50% wattage by the removal of one or two wires respectively.

B. HEATER SECTION: The heater section shall consist of 20 gauge steel chassis on which are mounted the heating elements, fan motor and blade, fan control, thermal cutout and 3-pole contactor. Heater section shall be completely pre-wired.

C. HEATING ELEMENTS: The heating element shall be and shall be non-glowing design consisting of 80/20 NiCh resistance wire, enclosed in a steel sheath, to which steel plate fins are brazed. The elements shall cover the entire air intake area to ensure uniform heating of all discharged air. The heating element shall be manufacturer warranted for 10 years from manufacturing defects

D. MOTOR AND CONTROLS: The fan motor shall be impedance protected, permanently lubricated and with totally-enclosed rotor. Fan control shall be bi-metallic, snap-action type and shall activate fan after the heating element reaches operating temperature, and continue to operate the fan after the thermostat is satisfied and until all heated air has been discharged. Thermal cutout shall be bi-metallic snap-action type designed to automatically shut off the heater in the event of overheating and reactivate the heater when the temperature returns to normal.

E. OPERATIONAL CONTROLS: Thermostat, disconnect switch and all interlock relays shall be installed within the heater enclosure.

F. RECESS ENCLOSURE: The back box shall be designed for duty as a recessed rough-in box in masonry, T-Bar or frame ceiling construction. The back box shall be 20 gauge galvanized steel and shall contain knockouts through which field wiring leads are brought. Enclosure to recess into a maximum 7 inches of ceiling space. The louvered recess faceplate shall be 20 gauge cold rolled steel, phosphatized, then electro-statically painted Navajo White by a baked enamel process.

G. SURFACE ENCLOSURE: The surface mounting plate shall be designed for duty as a rough-in box on masonry, T-Bar or frame ceiling construction. The surface mounting plate shall be 20 gauge galvanized steel and shall contain knockouts through which field wiring leads are brought. Enclosure to extend a maximum of 6 inches into the heated space. The louvered surface wrapper shall be a contoured aluminum extrusion and 20 gauge sheet metal combination with rounded corners. The surface wrapper shall be electro-statically painted Navajo White by a baked enamel process.

2.02 CEILING MOUNT HEATERS

A. The heating equipment shall include an electric, wall-mounted type QFG, fan-forced air heater suitable for small area heating as manufactured by QMark, Berko, Marley or approved equal. The heater shall be UL Listed. The heater shall be designed for surface, recess mounting. For surface mounting a GFRSM surface mounting box shall be provided.

B. The back box shall be designed for duty as recessed rough-in box in wither masonry or frame construction. The back box shall be heavy gauge galvanized steel and shall contain knockouts through which filed wiring leads enter the box. Detachable back box mounting brackets shall be used to insure proper installation.

C. The inner frame assembly shall consist of a heavy gauge galvanized steel chassis on which are mounted the heating element, protected motor and tangential blower and over temperature protector. The inner frame assembly shall be completely pre-wired with pigtail leads for field wiring. The inner frame assembly shall lock into back box without fasteners.

D. Heating element shall be fast response open coil for quick warm up and low maintenance. The element shall cover the entire air discharge area to ensure uniform heating of all discharge air. The wattage output of the unit shall be adjustable by moving jumper wires on a wattage terminal board.

E. The fan motor shall be impedance protected and permanently lubricated. Thermal cutout shall be bi-metallic snap-action type designed to automatically shut off the heater in the event of overheating. A pilot light shall be provided that illuminate if over temperature protector operates. The element shall contain a "one-shot" thermal protector that acts as a back-up protector.

F. The louvered front cover shall be of commercial grade steel finished in Northern White high temperature polyester powder coating. It will attach to the back box with two screws.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions at the job site where work of this section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.02 PREPARATION

A. Examine the Contract Drawings and specifications in order to insure the completeness of the work required under this Section.

B. Verify measurements and dimensions at the job site and cooperate in the coordination and scheduling of the work of this Section with the work of related trades, so as not to delay job progress.

3.03 INSTALLATION

A. Installation of Heaters

1. Install heaters as indicated, and in accordance with manufacturer's installation instructions.
2. Locate heaters as indicated, coordinate with other trades to assure correct recess size for recessed units.
3. Install wiring as indicated.
4. Protect units with protective covers during balance of construction.

B. Electrical Wiring

1. Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electric Contractor.
2. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 26 sections. Do not proceed with equipment startup until wiring installation is acceptable to equipment manufacturer.

3.04 ADJUSTING AND CLEANING

A. After construction is completed, including painting, clean unit exposed surfaces, vacuum clean coils and inside of cabinets. Retouch any marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.

END OF SECTION

SECTION 238220

AIR CURTAINS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes air curtains.

1.02 DEFINITIONS

A. For convenience purposes a few definitions are indicated herein. All capacities, ratings and other specified and scheduled air curtain criteria are based on these definitions.

1. Air Curtain: An air moving device which produces a directionally-controlled airstream, moving across the entire height and width of an opening.

2. Unit Airflow Rate: The airflow volume which leaves the discharge nozzle, at standard air conditions, and reported in CFM.

3. Average Outlet Velocity: The airflow rate produced by the air curtain divided by the cross sectional area of the discharge nozzle plane at free-air delivery, and reported in FPM.

4. Outlet Air Velocity Uniformity: An indicator of the consistency of air velocities across the air curtain width, expressed as a percentage.

5. Air Discharge Angle: The angle between the plane of the protected opening and the direction in which the air stream leaves the discharge.

1.03 SYSTEM DESCRIPTION

A. An air curtain is an air moving device which produces a directionally-controlled airstream, moving across the entire height and width of an opening.

1.04 SUBMITTALS

A. Submittals are required to show full compliance with the contract documents.

B. Indicate each air curtain tag/mark number on the submittal as applicable.

C. Product Data:
1. Product Data must have the specific Contract Document air curtain mark/tag on each submittal with all information associated with each unit clearly identified. Where information does not apply to the product being provided then such information must be marked off on the submittal.

2. Rated capacities showing compliance with Contract Document requirements scheduled on drawings. Capacities including but not limited to: Airflow

(CFM), discharge velocity (FPM), noise rating (dBA), motor quantity and horsepower, electrical ratings (FLA, volts/phase/hertz), outlet velocity uniformity (%), unit assembly weight (lbs).

3. Mechanical Drawings.

4. Wiring Diagrams.

5. Standard product features.

6. Optional product features and accessories.

D. Shop Drawings

1. Provide drawings showing air curtain assembly and parts.

2. Wiring Diagrams: Power, signal, and control wiring. The wiring diagram must indicate a clear distinction between manufacturer's factory furnished and installed wiring, and contractor furnished and installed wiring for all power, signal and control wiring and accessories.

E. Installation Instructions: Manufacturer's installation instructions with diagrams, instructions and manufacturer's contact information.

F. Operation and Maintenance Data: Complete documentation of manufacturer's recommended operation and maintenance procedures for the air curtain including commissioning procedures.

G. Manufacturer's Warranty statement for products and parts.

H. Contractor's Warranty statement for repair and replacement of products and parts.

1.05 QUALITY ASSURANCE

A. The Contract Document Drawings and Specifications indicate the "basis-of-design" manufacturer, model, size, profiles, and dimensional requirements of air curtains.

B. Comply with all applicable ordinances, codes and standards as required by the authorities having jurisdiction.

C. Comply with NFPA 70 - National Electrical Code.

D. ETL Listed (Tested in accordance with ANSI/UL 1995, 2nd edition, 1995-09-29 Rev: 1999-08031).

1.06 COORDINATION

A. Coordinate layout and installation of air curtains, mounting system and all components associated with the air curtains with other construction.

B. Notify the architect/engineer of any coordination conflicts prior to installation of the air curtain or other associated parts and accessories so that the installation can be

coordinated prior to installation. Any installation that is commenced or completed without coordination is subject to rejection of the work and must be redone as required to meet the intent of the contract documents.

1.07 WARRANTY

A. Provide manufacturer's standard warranty for replacement of parts for a period of 24 months for the non-heated model [18 months for models with heat] from the time of shipment from the manufacturer. The warranty must cover all parts, components, accessories, etc. provided with the air curtain whether or not the parts, components or accessories are the direct product manufactured by the air curtain manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Basis-Of-Design Manufacturer: All air curtains furnished are complete factory assembled units as manufactured by Mars Air Systems.

2.02 EQUIPMENT BASIC DESCRIPTION – BASIS-OF-DESIGN

A. Each unit consists of a factory assembled powder coated steel casing, cross flow fans, raised stainless steel inlet screen, discharge nozzle, and motor(s). Additional accessories as specified. The air curtain provides a specific CFM and a uniform outlet velocity across the entire length of the discharge nozzle area.

2.03 CASING

A. Housing Materials: Steel construction, corrosion proof paint lock metal and double protected with Obsidian Black rust preventive electrostatic polyurethane powder coating.

B. Unit Support: Integral to the unit frame or casing. Units shall be furnished in single increments of sufficient structural strength to be supported from the top or back per manufacturer's instructions.

2.04 AIR DISCHARGE NOZZLE

A. Air curtain creates a positive air seal with directional air foil aluminum vane. The vane shall facilitate a deflection of the air stream for 40 degrees sweep from front to back.

2.05 FANS

A. Wheels: Aluminum balanced forward curved tangential type with flexible hubs.

B. Drives: Direct Drive. Belt Drive Not Acceptable.

2.06 MOTORS:

A. Type: Totally enclosed Air Over (TEAO), resiliently mounted, continuous duty, air over with integral thermal-overload protection. Motors to have double extended shaft

and direct drive cross flow blower wheels.

B. Bearings: Heavy duty type permanently lubricated, shielded ball bearings of equal size.

2.07 HEATING COIL:

A. Description: Factory mounted heating coil. The coil shall be mounted to the intake of air curtain.

B. Heating coils shall be open coil type nickel chromium for rapid temperature rise to be located in the air curtain intake, directly in the air stream. Non reset-able thermal overload protection shall be provided, which shall directly disconnect power in event of overload. Secondary protectors in the heating contactor shall not be substituted.

2.08 ACCESSORIES:

A. Mounting Brackets: Steel construction of shape and size as coordinated with the mounting location.

B. Automatic Door Switch: Remotely installed in the door area to activate the unit each time the door opens and deactivate the unit each time the door closes.

C. Adjustable Time Delay: Integral part of the unit, only used with an automatic door switch. Air curtain to operate until specified time (adjustable from 2.0 to 120 seconds) after the door closes.

D. Hand/Off/Auto Switch: Acts as an override to the automatic door switch. In Hand position the air curtain is on, in Off position the air curtain is off, and in Auto position the air curtain runs via the automatic door switch. Remote mounted.

E. Thermostat with remote temperature sensor. Locate thermostat in coordination with Architect.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Examine the installation location where each air curtain will be installed to confirm that the installation location is in accordance with the Contract Documents and the Manufacturer's Installation Instructions.

B. If there are any concerns regarding the installation location with respect to any aspect of the installation or performance of the air curtain notify the architect/engineer in order to resolve the concern.

3.02 INSTALLATION:

A. Install each air curtain in accordance with the Installation Instructions provided by the manufacturer of the air curtain.

3.03 SYSTEM STARTUP

A. Startup each air curtain in accordance with the manufacturer's Operations and Maintenance Manual and Installation Instructions.

3.04 FIELD QUALITY CONTROL:

A. Perform the following field tests and inspections and prepare test reports:

1. After installing air curtains completely, perform visual and mechanical check of individual components.

2. After electrical circuitry has been energized, start unit to confirm motor rotation and unit operation.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Repair or replace malfunctioning units and retest as specified above.

3.05 ADJUSTING:

A. Adjust air-directional vanes.

3.06 CLEANING:

A. Clean the outside of each air curtain of any dirt, debris, grease, grime or other material.

B. Clean the inside of each air curtain of any dirt, debris, grease, grime or other material as necessary to ensure proper operation. Remove any loose debris that may be of harm to the air curtain operation.

3.07 DEMONSTRATION:

A. Contractor to instruct the Owner's maintenance personnel on how to adjust, operate, and maintain air curtains.

END OF SECTION

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SECTION 26 0500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08, Section 083100 "Access Doors and Panels."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07, 078413 Section "Firestopping".

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Link-Seal (PSI Corp.)
b. Calpico, Inc.
c. Metraflex Co.
d. Approved Equal

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

F. Existing Generator Testing (Phase I):
1. The existing generator shall be tested under a power outage simulation by opening the existing main circuit breaker within the existing building prior to any new work.
2. The existing generators performance characteristics to be documented shall be as follows:
   a. How long does it take for the generator to turn on and re-feed the electrical load?
   b. Any unusual characteristics during runtime (i.e. smoke by the generator, unusual noise, flickering or malfunctioning of any lighting or equipment fed by the generator, etc.)

G. Existing Generator Disconnection (Phase I):
1. After the existing generator testing, initiate any bypass methods to allow for the shutdown of any live conductors connected to the generator so as not to activate the generator. Consult the manufacturer as necessary.
2. Once it is confirmed that all required steps in #1 above has been complete, disconnect all existing conductors incoming and outgoing from the existing generator.
3. Provide any and all forms of physical protection methods for the generator to protect it from any debris or fallen objects throughout the course of construction as may be recommended by the manufacturer.

H. Existing Generator Reinstallation (Phase I):
1. After new reconnection conductors are installed and ready for connection, remove any and all physical protection items/equipment (required in part G above) and terminate conductors as required by the electrical drawings.
2. Once conductors are connected as required by the electrical drawings, simulate a power outage similar to part F above.
3. Note any deviances from the original performance characteristics list generated from part F above.
4. Perform any required tune-up procedures as recommended by the manufacturer. Engage a manufacturer technical representative/field representative as necessary to perform this task.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07, Section 079000 "Joint Sealers".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07, Section 078413 "Firestopping."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07, Section 078413 "Firestopping".

END OF SECTION 26 5000

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SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For testing agency.

C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. Southwire Company.
4. Approved Equal

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THW, THHN-THWN, XHHW, UF, USE, and SO.

D. Multiconductor Cable: Comply with NEMA WC 70 for armored cable, Type AC, metal-clad cable, Type MC with ground wire.

2.2 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. Approved Equal

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.4 SLEEVE SEALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Link-Seal (PSI Corp.)
2. Calpico, Inc.
3. Metraflex Co.
4. Approved Equal

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway, or type XHHW, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Metal-clad cable, Type MC.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Metal-clad cable, Type MC.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, and strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
2. For sleeve rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both wall surfaces.

G. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

H. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and cable unless sleeve seal is to be installed.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.6 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.

   a. Feeders between existing generator and new automatic transfer switch.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 26 0519

SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:

1. Test wells.
2. Ground rods.
3. Ground rings.
4. Grounding arrangements and connections for separately derived systems.
5. Grounding for sensitive electronic equipment.

C. Qualification Data: For testing agency and testing agency's field supervisor.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:

1.4 QUALITY ASSURANCE

A. 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.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copperwire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Rectangular bars of annealed copper in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Metal Underground Water Pipe: Metal, underground water pipe in direct contact with earth for at least 10-feet (3-meters) and electrically continuous from the points of connection of the electrode conductor and the bonding conductors. Interior metal water pipes located more than 5-feet from the building shall not be used.

B. Concrete Encased Electrode ("Rebar"): An electrode encased by at least 2-inches of concrete at the bottom of a concrete foundation or footing that is in direct contact with earth consisting of at least 20-feet of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods not less than 0.5-inches in diameter, or consisting of at least 20-feet of bare copper conductor no smaller than 4AWG. "Rebars"

shall be permitted to be bonded together by steel tie wires or other means which are effective.

C. Ground Rods: Copper-clad steel with high-strength steel core and electrolytic-grade copper outer sheath, molten welded to core.

1. Size: Trade size 3/4 by 10-feet (metric designator 21 by 3000 mm).

D. Plate Electrodes: Copper plates. Shall expose not less than 2ft squared of surface area to exterior soil. Minimum 0.25 inch (6.4 mm) in thickness, 24 inch (600mm) square.

E. Ground Ring: Ground ring encircling building in direct contact with earth made of at least 20-feet of bare copper with a conductor size of not less than 2AWG.

F. Metal Frame of Building or Structure: Any of the following methods are deemed an acceptable means of making an earth connection through the metal frame of the building structure:

1. At least 10-feet of a single structural metal member in direct contact with earth or encased in concrete which is in direct contact with earth.
2. Structural metal frame is bonded to at least one of the grounding electrodes defined above.
3. Other approved means of establishing a connection to earth.

G. Electrodes Not Permitted for Grounding:

1. Gas piping systems which are metal and underground.
2. Aluminum electrodes.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches (100 mm) will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches (150 mm) from the foundation.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.

5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
10. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

G. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

H. Metal and Wood Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.

1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

H. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of building.

1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.
2. Bury ground ring not less than 30 inches (750 mm) from building foundation.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.

a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
b. Perform tests by fall-of-potential method according to IEEE 81.

3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Report measured ground resistances that exceed the following values:

C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

D. Maximum grounding resistance shall be 25 ohms.

E. Report: Prepare test reports, certified by the testing organization, of ground resistance at each test location. Include observations of weather and other phenomena that may affect test results.

F. Field Test Reports: Submit written test reports to include the following:
1. Test procedues used.

2. Test results that comply with requirements.

3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

END OF SECTION 26 0526

SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

B. Related Sections include the following:

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.
2. Nonmetallic slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. Approved Equal

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c., in at least 1 surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. Fabco Plastics Wholesale Limited.
d. Approved Equal

2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
3. Fitting and Accessory Materials: Same as channels and angles.
4. Rated Strength: Selected to suit applicable load criteria.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Hilti Inc.
      2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      3) MKT Fastening, LLC.
      4) Approved Equal

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) Approved Equal

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.

5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 0529

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SECTION 26 0533
RACEWAYS AND BOXES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related sections include the following:

1. Section 078413 "Penetration Firestopping." for firestopping.

2. Section 26 0529 "hangers and Supports for Electrical Systems" for raceway and box supports.

3. Section 26 2726 "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical non-metallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquidtight flexible metallic conduit.

F. RNC: Rigid nonmetallic conduit.

1.04 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.05 QUALITY ASSURANCE

A. 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.

B. Comply with NFPA 70, as amended by state and local codes.

1.06 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system and partition assemblies.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering Products that may be incorporated in the Work include, but are not limited to, the following:

2.02 METAL CONDUIT AND TUBING

A. Available Manufacturers

1. Alflex Corp
2. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
3. LTV Steel Tubular Products Company.
4. Wheatland Tube Co.
5. Triangle PWC, Inc.
6. Substitutions: approved equal.

B. Rigid Steel Conduit: ANSI C80.1

C. IMC: ANSI C80.6.

D. EMT and Fittings: ANSI C80.3.

1. Fittings: Set-screw or compression.

E. FMC: Zinc coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings: NEMA FB1; compatible with conduit and tubing materials.

H. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.

2.03 METAL WIREWAYS

A. Available Manufacturers:

1. Hoffman.

2. Square D

3. The Wiremold Company

4. Substitutions: approved equal.

B. Material and Construction: Sheet metal sized and shaped as indicated.

1. Dry locations: NEMA 250, Type1.
2. Damp or Wet locations: NEMA 250, Type 3R.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for a complete system.

D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

E. Wireway Covers: Screw-cover type.

F. Finish: Manufacturer's standard enamel finish.

2.04 SURFACE RACEWAYS

A. Surface Metal Raceway: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating.

1. Available Manufacturers:

a. Thomas & Betts Corporation.

b. Walker Systems, Inc; Wiremold Company (The)

c. The Wiremold Co., Electrical Sales Division.

d. Substitutions: approved equal.

B. Types, sizes and channels as indicated and required for each application, with fittings that match and mate with raceways.

2.05 BOXES, ENCLOSURES AND CABINETS

A. Available Manufacturers:

1. Cooper Crouse-Hinds; Div. Of Cooper Industries, Inc.

2. Emerson/General Signal; Appleton Electric Company.

3. Erickson Electrical Equipment Co.

4. Hoffman.

5. Hubbell, Inc.; Killark Electric Manufacturing Co.

6. O-Z/Gedney; Unit of General Signal.

7. RACO; Division of Hubbell, Inc.

8. Spring City Electrical Manufacturing Co.

9. Thomas & Betts Corporation.

10. Walker Systems Inc.; Wiremold Company (The).

11. Substitutions: approved equal.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast Metal Outlet and Device Bopxes: NEMA FB 1, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1. Boxes shall be sized to in accordance with the New York City Electrical Code.

F. Cast Metal Pull and Junction Boxes: NEMA FP 1 cast aluminum with gasketed cover. Boxes shall be sized to in accordance with the New York City Electrical Code.

G. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and associated hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

H. Pull boxes for Telephone and Signal System Raceways: ANSI/EIA/TIA-569A

2.06 FACTORY FINISHES

A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard prime-coat finish ready for field painting.

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

A. Outdoors: Use the following wiring methods, except as specifically noted otherwise.

1. Exposed: Rigid steel or IMC.

2. Concealed: Rigid steel or IMC.

3. Connection to Vibrating Equipment (including transformers and hydraulic, pneumatic, electric solenoid, or motor driven equipment): LFMC.

4. Boxes and Enclosures: NEMA 250, Type 3R or 4.

B. Indoors: Use the following wiring methods:

1. IMC for all purposes and in all applications except where specifically excluded, or where alternate methods are specified below.

2. Normal feeders to fire pump: Rigid steel conduit. Normal feeder conduit encased in 2 inches (5cm) of concrete (or other approved equivalent) where conduits are not physically routed outside the building. Exclude concrete for jockey pumps and/or auxiliary pumps.

3. Utilize EMT for:

a. Main and submain feeders.

b. Branch feeders.

c. Lighting and appliance branch circuitry.

4. Exposed lighting and appliance branch circuitry runs in: Surface metal raceway.

5. Armored cable (Type AC) as specified in Division 26 Section "Low Voltage Electrical Power Conductors and Cables" is acceptable as an alternate wiring method for lighting and appliance branch circuitry for runs concealed in the voids of hung ceilings and hollow partitions.

6. Refer to appropriate Sections of Division 26 for additional requirements relating to wiring methods for fire alarm systems, and other communication and alarm system distribution where applicable.

7. Wiring methods listed above shall be restricted as follows:

a. Exclude EMT from concrete embedment, from locations where subject to mechanical damage and from exposed locations in finished spaces.

b. Exclude surface metal raceway from concealed installations, from locations where subject to mechanical damage and from wet or damp locations.

c. Exclude armored cable from exposed locations and from runs opening into wet or damp locations.

d. Exclude armored cable (Type AC) from areas of public assembly and all spaces (including voids of walls and ceilings) not separated therefrom by

fire rated construction adequate for the purpose.

e. Utilize only intermediate or rigid steel conduit from runs in (or opening into) hazardous areas. Comply with electric code requirements regarding sealing fittings, boxes, enclosures as appropriate for the conditions of atmospheric contamination.

8. The following shall be treated as damp or wet locations within building confines, regardless of whether or not a high ambient moisture level is found to exist:

a. Spaces where any designations indicating weatherproof (WP) or vaporproof (VP) appear on the drawings.

b. Cooling tower areas.

c. Kitchens up to a height of 18inches (45 cm) above finished floor.

d. Outside of waterproofing in foundation walls in contact with grade.

e. Above waterproofing in slabs having no building above.

f. Spaces containing equipment owned and/or maintained by the electric utility company.

g. Electric work in slabs, walls or suspended ceilings which bound on a space defined as a damp or wet location shall meet the damp or wet location requirements if it enters into, or opens into the damp or wet location in any way.

C. Minimum Raceway Size: ½ inch (DN 16) trade size.

D. Indicated Raceway Size: Raceway sizes indicated are based on non-flexible conduit. Where flexible type raceways are specified, increase raceway size as required to maintain code mandated maximum conduit fill.

E. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.02 INSTALLATION

A. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceway as specified in Division 26 Section "Hangers and Supports for Electrical Systems"

D. Install temporary closures to prevent foreign matter from entering raceway.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

F. Make bends and offsets so the inside diameter is not reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

H. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much possible.

1. Run parallel or banked raceways together on common supports.

2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

I. Join raceways with fittings designed and approved for the purpose and make joints tight.

1. Use insulating bushings to protect conductors.

J. Tighten set screws of threadless fittings with suitable tool.

K. Equip all raceways which cross building expansion or control joints, with expansion fittings having flexible grounding bonds bypassing sliding parts.

L. Terminations:

1. Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely, and install the locknuts with dished part against the box. Use two locknuts, one inside and one outside box.

2. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.

M. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line having not less than 200-lb (90 kg) tensile strength. Leave not less than 12 inches (300 mm) of slack at each end of the pull wire.

N. Telephone and Signal System Raceways 2-Inch Trade Size (DN 53) and Smaller: In addition to the above requirements, install in maximum lengths of 100 feet (30 m) and with a maximum of two 90-degree bends or equivalent. Install pull or junction boxes where necessary to comply with these requirements. Pull or junction boxes shall be sized

in accordance with ANSI/EIA/TIA-569A guidelines.

O. Install raceway sealing fittings according to the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:

1. Where conduits pass from warm locations to cold locations, such as the boundaries of refrigerated spaces and air-conditioned spaces.

2. Where otherwise required by the NFPA70.

P. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches (150 mm) above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

Q. Flexible Connections: Use maximum of 6 feet (1.8 m) of FMC for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in wet or damp locations. Install separate ground conductor across flexible connections.

R. Install hinged cover enclosures and cabinets plumb. Support at each corner.

S. To the extent that circuitry cannot be embedded in concrete slabs and fill, floor and wall mounted outlets shall be supplied in conformance with so-called "poke through system" criteria as described below. Outlets supplied from a specialty cast-in-floor raceway system constitute an exception to this criterion.

T. Criteria for the "poke through" system of circuitry are as follows:-

1. Circuitry shall be run in the hung ceiling space of the story which it serves or in the hung ceiling space of the story immediately below, utilizing openings cut through the floor slab when necessary.

2. The running of circuitry, at the story below the one served, shall be held to an absolute minimum, and shall be used only for tying floor outlets to their nearest adjacent outlets or for other such unavoidable purposes.

3. Circuitry serving a given story shall emanate from local supply or central facilities on the same story and none other.

4. Openings through floor slabs shall be cut, patched and "firestopped" as part of the electrical work. "Firestopping" shall include the filling in of excess opening spaces as well as the utilization of approved, fire-rated through-floor fittings for all floor outlets. These fire-rated fittings shall each be of the "dual service" type, complete with integral floor stanchion which can accommodate 120 volt and telephone and/or signal) circuitry and devices. All "firestopping" shall be performed as directed in the field. General instructions establishing cutting,

patching and "firestopping" separate from the electric work are not applicable to the poke through system of circuitry.

5. Openings through floor slabs shall not be spaced closer together than 2 feet (61 cm), and no more than one fire-rated fitting per 65 square feet (6 square meters) of floor area in each span shall be utilized.

3.03 LOCATING AND ROUTING CIRCUITRY

A. All circuitry shall be run concealed except that it shall be run exposed:-

1. Horizontally at the ceiling of permanently unfinished spaces which are not assigned to mechanical or electrical equipment.

2. Horizontally and vertically in mechanical equipment spaces.

3. Horizontally and vertically in electric equipment rooms.

B. Concealed circuitry shall be so located that building construction materials can be applied over its thickest elements without being subject to spalling or cracking.

3.04 INSTALLING JUNCTION, PULL AND OUTLET BOXES

A. Apply junction and pull boxes in accordance with the following:-

1. Include pull boxes in long straight runs of raceway to assure that cables are not damaged when they are pulled in.

2. Include junction and pull boxes to assure a neat and workmanlike installation of raceways.

3. Include junction and pull boxes to fulfill requirements pertaining to the limitations to the number of bends permitted in raceway between cable access points, the accessibility of cable joints and splices, and the application of cable supports.

4. Where the wires and cables following the same routing are indicated as running through separate pull boxes, it shall be understood that a segregation of the wires and cables is required. Separately indicated pull boxes may be incorporated into single boxes on condition that segregation is maintained by barriers of the type hereinafter specified.

5. Include all required junction and pull boxes regardless of indications on the drawings (which, due to symbolic methods of notation, may omit to show some of them).

B. Apply outlet boxes in accordance with the following:-

1. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures shall not be used as replacements for the boxes specified herein

unless they are specifically rated to accept "through circuit" building wires.

2. A continuous row of fixtures of the end-to-end channel type, designed for "through wiring," and wired in accordance with the specifications hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.

3. A series of separate fixtures, designed for "through wiring," spaced not more than 2 feet (600mm) apart, and interconnected with conduit or raceway and circuitry which is in accordance with the specifications hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.

4. Connection to recessed ceiling fixtures supplied with pigtails may be arranged so that more than one, but not more than four, such fixtures are connected into a single outlet box. When adopting this procedure:-

   a. Utilize an outlet box no smaller than 4-11/16 inches (119mm) square by 2-1/8 inches (54 mm) deep.

   b. Allow no fixture to be supplied from an outlet box in another room.

5. Multiple local switches indicated at a single location shall be gang mounted in a single outlet box.

6. Include all required outlet boxes regardless of indications on the drawings (which due to symbolic methods of notation, may omit to show some of them).

7. Regardless of any indications on the drawings, flush wall mounted outlet boxes shall not be set back-to-back in fire rated walls or partitions, even if they are displaced vertically. Such outlets shall be offset horizontally by 24 inches (610mm) or as otherwise required to maintain the fire rating.

8. Flush wall mounted outlet boxes in non-fire rated construction shall not be set back-to-back, but shall be offset at least 12 inches (30 cm) horizontally regardless of any indication on the drawings.

C. Install junction boxes, pull boxes and outlet boxes in accordance with the following:-

1. Exclude surface mounted outlet boxes in conjunction with concealed circuitry.

2. Exclude unused circuitry openings in junction and pull boxes. In larger boxes each such opening shall be closed with a galvanized sheet steel plate fastened with a continuous weld all around. In small outlet type boxes, utilize plugs as specified for such boxes.

3. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock-out plugs.

4. Pack "through the wall" collar type outlet boxes with a sound deadening, non-hardening, non-hygroscopic, non- combustible, high dielectric stuffing material manufactured specifically for the purpose.

5. Outlet boxes for switches shall be located at the strike side of doors. Indicated door swings are subject to field change. Outlet boxes shall be located on the basis of final door swing arrangements.

6. Boxes and plaster covers for duplex receptacles shall be arranged for vertical mounting of the receptacle.

7. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.

D. Barriers in junction and pull boxes of outlet size shall be of the same metal as the box.

E. Barriers in junction and pull boxes which are larger than outlet size shall be of polyester resin fiberglass of adequate thickness for mechanical strength but in no case less than 1/4 inch (6.5mm). Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

3.05 MOUNTING HEIGHTS

A. Heights of all wall mounted outlets and equipment shall be in accordance with the following list. (Dimensions are above finished floor unless noted.)

1. Receptacle or telephone outlet in field constructed wall, partition or column unless otherwise specified below -- 18 inches (45 cm) to centerline.

2. Receptacle or telephone outlet in factory fabricated wall or partition, unless otherwise specified below -- Dimension determined by wall or partition construction.

3. Receptacle or telephone outlet in mechanical spaces, electric switchboard rooms, electric closets -- 60 inches (150 cm) to centerline.

4. Toggle switch outlet in field constructed wall partition or column -- 46 inches (117 cm) to centerline.

5. Toggle switch outlet in factory fabricated wall or partition -- Dimension determined by wall or partition construction.

6. Bracket lighting outlets, except for "over door" -- 90 inches (228 cm) to centerline.

7. Bracket lighting outlet over door -- as required to center outlet between top surface of door lintel and underside of ceiling.

8. Wall exit sign except for over door -- 90 inches (228 cm) to centerline.

9. Exit sign over door -- As required to center sign between top surface of door lintel and underside of ceiling.

10. Outlet for any signal system device other than fire alarm station requiring manual operation -- 46 inches (117 cm) to centerline.

11. Manual fire alarm station -- 46 inches (117 cm) to centerline.

12. Outlet for any signal system visual or sounding device other than fire alarm visual device or visual/sounding device -- As required for device to clear underside of ceiling by 1 inch (25 mm).

13. Outlet for fire alarm visual device -- Visual device 80 inches (203 cm) AFF, except as otherwise noted.

14. Clock outlet -- As required for clock to clear underside of ceiling by 1 inch (25 mm).

B. Architectural drawings and field instructions issued by the Architect take precedence over the above list and shall be adhered to.

3.06 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, to ensure that coatings, finishes, and cabinets are without damage or deterioration at Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC or paint finishes with matching touch-up coating recommended by the manufacturer.

3.07 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION 20 0533

SECTION 260548 - VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Isolation pads.
2. Restraint cables.
3. Hanger rod stiffeners.
4. Anchorage bushings and washers.

B. Related Sections include the following:

1. Division 26 Section "Hangers And Supports For Electrical Systems" for commonly used electrical supports and installation requirements.

1.3 DEFINITIONS

A. The IBC: International Building Code.

B. ICC-ES: ICC-Evaluation Service.

1.4 PERFORMANCE REQUIREMENTS

A. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: Class C, confirm with project Architect
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: Group II – confirm with project Architect.

a. Component Importance Factor: 1.5 for the Generator, the 30 Amp automatic transfer switch feeding the fire alarm control panel along with the associated two(2) 30 Amp disconnect switches and conduits, the main fire alarm control panel, and all fire alarm system wiring devices and associated conduits.
b. Component Response Modification Factor and Amplification Factor: As determined by seismic design professional

3. Design Spectral Response Acceleration at Short Periods (0.2 Second): As determined by seismic design professional
4. Design Spectral Response Acceleration at 1.0-Second Period: As determined by seismic design professional

1.5 SUBMITTALS

A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.

    a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdition.
    b. Annotate to indicate application of each product submitted and compliance with requirements.

3. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.
4. Seismic-Restraint Details:

    a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
    b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events.
    c. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

B. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.

C. Welding certificates.

D. Qualification Data: For professional engineer and testing agency.

E. Field quality-control test reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval ICC-ES or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

E. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Amber/Booth Company, Inc.
2. Kinetics Noise Control.
3. Mason Industries.
4. Vibration Eliminator Co., Inc.
5. Vibration Mountings & Controls, Inc.

B. Pads : Arrange in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.

1. Resilient Material: Oil- and water-resistant neoprene, rubber, or hermetically sealed compressed fiberglass.

2.2 SEISMIC-RESTRAINT DEVICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Amber/Booth Company, Inc.
2. Cooper B-Line, Inc.; a division of Cooper Industries.
3. Hilti Inc.
4. Mason Industries.
5. Unistrut; Tyco International, Ltd.

B. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

D. Restraint Cables: ASTM A 603 galvanized-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.

E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Do not weld stiffeners to rods.

F. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchors and studs.

G. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.

H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

I. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

J. Adhesive Anchor: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.3 FACTORY FINISHES

A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

1. Powder coating on springs and housings.
2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
3. Baked enamel or powder coat for metal components on isolators for interior use.
4. Color-code or otherwise mark vibration isolation and seismic-control devices to indicate capacity range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Hanger Rod Stiffeners: Install hanger rod stiffeners where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Equipment and Hanger Restraints:

1. Install restrained isolators on electrical equipment.
2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

D. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.

3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.
9. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust isolators after isolated equipment is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust active height of spring isolators.

D. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.7 ELECTRICAL VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE SCHEDULE

A. All equipment associated with the fire alarm system to be seismically restrained shall include, but not be limited to, the following:.

Item / Equipment	Location & Mounting
Generator	Floor mounted; see drawings for location
30 Amp Automatic Transfer Switch	Wall mounted; see drawings for location
Two (2) 30A Fire Alarm Disconnect switches (Normal and Emergency Power)	Wall mounted; see drawings for location
Fire Alarm Control Panel	Wall mounted; see drawings for location
Fire Alarm System Devices and Wiring	Ceiling and Wall mounted; see drawings for locations

B. All equipment listed in the above table shall have liquid-tight flexible steel conduits installed as the last portion of conduit with a minimum of 3-feet of slack. Provide junction boxes as necessary to perform transition from rigid metal conduits to liquid-tight flexible steel conduits.

END OF SECTION 260548

SECTION 26 0553
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, NYC Electrical Code, OSHA standards, and authorities having jurisdiction.

1.03 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Schedule of Nomenclature: An index of electrical equipment and system components used in identification signs and labels.

1.04 QUALITY ASSURANCE

A. Comply with NFPA 70 NYC Electrical Code.

B. Comply with ANSI A13.1 and NFPA 70 for color-coding.

C. Comply with ANSI Z535-4 and NFPA 70E.

PART 2 - PRODUCTS

2.01 RACEWAY AND CABLE LABELS

A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

1. Color: Black letters on orange field.

2. Legend: Indicates voltage and service.

B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend over laminated with a clear, weather- and chemical-resistant coating.

C. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2

inches wide ((0.08 mm thick by 25 to 51 mm wide)).

E. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

F. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch- ((0.4-mm-)) hick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.

G. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.

H. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inch ((0.05 mm)) thick, laminated with moisture-resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.

I. Brass or Aluminum Tags: 2 by 2 by 0.05-inch ((51 by 51 by 1.3-mm)) metal tags with stamped legend, punched for fastener.

2.02 NAMEPLATES AND SIGNS

A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.

B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch ((1.6 mm)) thick for signs up to 20 sq. in. ((129 sq. cm)) and 1/8 inch ((3.2 mm)) thick for larger sizes.

1. Engraved legend with black letters on white face.

2. Punched or drilled for mechanical fasteners.

C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch ((6.4-mm)) grommets in corners for mounting.

D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch ((1-mm)) galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch ((6.4-mm)) grommets in corners for mounting.

E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

2.03 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch ((5 mm)).

2. Tensile Strength: 50 lb ((22.3 kg)) minimum.

3. Temperature Range: Minus 40 to plus 185 deg F ((Minus 40 to plus 85 deg C)).

4. Color: According to color-coding.

B. Paint: Formulated for the type of surface and intended use.

1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.

2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.

3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.

4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before applying.

E. Install painted identification according to manufacturer's written instructions and as follows:

1. Clean surfaces of dust, loose material, and oily films before painting.

2. Prime surfaces using type of primer specified for surface.

F. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:

1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches ((51 mm)) wide, completely encircling conduit.

2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot ((15-m)) maximum intervals in straight runs, and at 25-foot ((7.6-m)) maximum intervals in congested areas.

3. Apply the following colors to the systems listed below:

   a. Fire Alarm System: Red.

G. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.

H. Secondary Service, Feeder, and Branch-Circuit Conductors: Color-code throughout the secondary electrical system.

1. Color-code 208/120-V system as follows:

   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.
   d. Neutral: White.
   e. Ground: Green.

2. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:

   a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch-(25-mm-) wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.

   b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches (76 mm) from the terminal and spaced 3 inches (76 mm) apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

I. Power Circuit Identification: Separately identify each power circuit, cable or feeder at each termination, and at each pull box, junction box, vault and manhole through which it passes.

1. Non-ferrous metallic tags or wrap-around bands for outdoor or underground use.

2. Plasticized card stock tags or wrap-around labels for indoor use.

3. Stamped or embossed letters (1/4" high) identifying feeder or circuit by number and origin.

J. Apply warning, caution, and instruction signs as follows:

1. Warnings, Cautions, and Instructions: Install to ensure safe operation and

maintenance of electrical systems and of items to which they connect. Include as a minimum warnings of Arc-Flash hazards and identification of series-rated devices. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

K. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with ½-inch- (13-mm-) high lettering on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

1. Panelboards, electrical cabinets, and enclosures.
2. Access doors and panels for concealed electrical items.
3. Switchboards.
4. Electrical substations.
5. Emergency system boxes and enclosures.
6. Disconnect switches.
7. Motor starters.
8. Transfer switches.
9. Contactors
10. Dimmers.
11. Control devices.
12. Fire alarm master station or control panel.

END OF SECTION 26 0553

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SECTION 260800

COMMISSIONING OF ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

B. The OPR and BOD documentation are included by reference for information only.

C. Division 01 section 'LEED Requirements' for additional LEED requirements.

1.2 SUMMARY

A. This section includes commissioning process requirements for Electrical systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DESCRIPTION

A. Refer to Division 01 Section "General Commissioning Requirements" for the description of commissioning.

1.4 DEFINITIONS

A. Refer to Division 01 Section "General Commissioning Requirements" for definitions.

1.5 SUBMITTALS

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's role.

B. Refer to Division 01 Section "Submittals" for specific requirements. In addition, provide the following:

C. Certificates of readiness

D. Certificates of completion of installation, prestart, and startup activities.

E. O&M manuals

F. Test reports

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the electrical contractor of Division 26 shall ultimately be responsible for all standard testing equipment for the electrical systems and controls systems in Division 26. A sufficient quantity of two-way radios shall be provided by each contractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.

D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the City of New York.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the installing contractors, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems

B. **Red-lined Drawings:** The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. **Operation and Maintenance Data:** Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been mad by the Contractor.

D. **Demonstration and Training:** Contractor will provide demonstration and training as required by the specifications. A complete training plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any training. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.

B. Attend construction phase controls coordination meetings.

C. Participate in Electrical systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CA.

D. Provide information requested by the CxA for final commissioning documentation.

E. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.

F. Prepare preliminary schedule for Electrical system orientations and inspections, operation and maintenance manual submissions, training sessions, equipment start-upand task completion for the Commissioner. Distribute preliminary schedule to commissioning team members.

G. Update schedule as required throughout the construction period.

H. Assist the CxA in all verification and functional performance tests.

I. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

J. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.

K. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

L. Notify the CxA a minimum of two weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.

M. Participate in, and schedule vendors and contractors to participate in the training sessions.

N. Provide written notification to the CM/GC and CxA that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.
1. Electrical equipment including switchgear, panel boards, motor control centers, lighting, receptacles, dimmers and all other equipment furnished under this Division.
2. Emergency generators, ATS switches and emergency power systems.
3. Fire alarm system

O. The equipment supplier shall document the performance of his equipment.

P. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

Q. Equipment Suppliers
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Commissioner, to keep warranties in force.
2. Assist in equipment testing per agreements with contractors.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

R. Refer to Division 01 Section "General Commissioning Requirements" for additional Contractor responsibilities.

3.3 COMMISSIONER'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Commissioner's Responsibilities.

3.4 DESIGN PROFESSIONAL'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Design Professional's Responsibilities.

3.5 CxA'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's Responsibilities.

3.6 TESTING PREPARATION

A. Certify in writing to the CxA that Electrical systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that Electrical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that testing procedures have been completed and that testing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.7 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of Electrical testing shall include the entire Electrical installation, from the incoming power equipment throughout the distribution system. Testing shall include measuring, but not limited to resistance, voltage, and amperage of system(s) and devices.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Electrical contractor and other contracted subcontractors, including the fire alarm Subcontractor shall prepare detailed testing plans, procedures, and checklists for Electrical systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the Electrical system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.8 ELECTRICAL SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. **Equipment Testing and Acceptance Procedures:** Testing requirements are specified in individual Division 26 sections. Provide submittals, test data, inspector record, infrared camera and certifications to the CA.

B. **Electrical Instrumentation and Control System Testing:** Field testing plans and testing requirements are specified in Division 26 Sections "Instrumentation and Control" and "Sequence of Operations" Assist the CxA with preparation of testing plans.

C. **Emergency Generator Testing and Acceptance Procedures:** Provide technicians, load banks, infrared cameras, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

D. **Fire Detection and Alarm System Testing:** Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. **Electrical Distribution System Testing:** Provide technicians, load banks, infrared cameras, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested

F. **Vibration and Sound Tests:** Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

G. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:

1. Automatic temperature controls integrated with the electrical systems
2. Coordination and functionality with the Building Automation System/Building Management Controls System
3. Fire Alarm System
4. Lighting Controls
5. Panelboards
6. Power Distribution System
7. Security System
8. Switchboard

3.9 DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.

3.10 APPROVAL

A. Refer to Division 01 Section "General Commissioning Requirements" for approval procedures.

3.11 DEFERRED TESTING

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deferred testing.

3.12 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.

B. Refer to Division 01 Section "General Commissioning Requirements" for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.13 TRAINING OF CITY OF NEW YORK PERSONNEL

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to training.

END OF SECTION 230800

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SECTION 26 0923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following lighting control devices:

1. Time switches.
2. Indoor occupancy sensors.
3. Lighting contactors.

B. Related Sections include the following:
1. Division 26 Section "Wiring Devices" for wall-box dimmers, wall-switch occupancy sensors, and manual light switches.

1.3 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive infrared.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. TORK
2. Intermatic, Inc.
3. Leviton Mfg. Company Inc.
4. Approved Equal

B. Electronic Time Switches: Electronic, solid-state programmable units with alphanumeric display; complying with UL 917.

1. Contact Configuration: SPDT.
2. Contact Rating: 10Amps for general purpose, 360Watts for tungsten, 360VA for pilot duty, ¼ HP for 120VAC motors, and 1/2HP for 208VAC motors..
3. Features shall include:
    a. Program: DISPLAY: LCD
    b. ASTRONOMIC:
    c. Adjustable 10°-60° Northern or Southern latitudes
    d. Can be individually offset +/- 1-299 minutes from both sunset and sunrise times.
    e. HOLIDAYS: 1 to 24 individual dates
    f. SEASONS: 1 to 4 with different daily schedules which can wrap around into the new year.
    g. DAYLIGHT SAVING: Automatic adjustment (can be omitted).
    h. LEAP YEAR: Automatic Compensation
    i. MANUAL OVERRIDE: Until the next regularly scheduled ON or OFF, automatic operation then resumes.
    j. CLOCK FORMAT: AM/PM or millitary time
    k. COPY FEATURE: Unit can be configured to copy program schedule to multiple memory modules
    l. SIGNAL/PULSE DURATION: 2 different setting per channel: each 1-99 seconds.
    m. POWER OUTAGE BACKUP: Permanent Schedule Retention forup to 40 years. Supercapacitor maintains real time.
4. Astronomic Time: All channels.
5. Battery Backup: For schedules and time clock.

2.2 INDOOR OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. TORK
2. Intermatic, Inc.
3. Leviton Mfg. Company Inc.
4. Approved Equal

B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.

1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
4. Mounting:

    a. Sensor: Suitable for mounting in any position on a standard outlet box.
    b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
6. Bypass Switch: Override the on function in case of sensor failure.
7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lx); keep lighting off when selected lighting level is present.

C. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

2.3 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

A. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 3/4 inch (13 mm).

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.

2. Identify circuits or luminaries controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
2. Operational Test: Verify operation of each lighting control device, and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 26 0923

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SECTION 26 2200 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:
   1. Buck-boost transformers.

1.3 SUBMITTALS

A. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

   1. Wiring Diagrams: Power, signal, and control wiring.

C. Qualification Data: For testing agency.

D. Source quality-control test reports.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7.

B. Source Limitations: Obtain each transformer type through one source from a single manufacturer.

C. 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.

D. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

A. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ACME Electric Corporation; Power Distribution Products Division.
2. Challenger Electrical Equipment Corp.; a division of Eaton Corp.
3. Controlled Power Company.
4. Eaton Electrical Inc.; Cutler-Hammer Products.
5. Federal Pacific Transformer Company; Division of Electro-Mechanical Corp.
6. General Electric Company.
7. Hammond Co.; Matra Electric, Inc.
8. Magnetek Power Electronics Group.
9. Micron Industries Corp.
10. Myers Power Products, Inc.
11. Siemens Energy & Automation, Inc.
12. Sola/Hevi-Duty.
13. Square D; Schneider Electric.
14. Approved Equal

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices except for taps.

1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: Copper.

2.3 BUCK-BOOST TRANSFORMERS

A. Description: Self-cooled, two-winding dry type, rated for continuous duty and with wiring terminals suitable for connection as autotransformer. Transformers shall comply with NEMA ST 1 and shall be listed and labeled as complying with UL 506 or UL 1561.

B. Enclosure: Ventilated, NEMA 250, Type 2.

1. Finish Color: As required by the Architect.

2.4 IDENTIFICATION DEVICES

A. Nameplates: Engraved, laminated-plastic or metal nameplate for each buck-boost transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Identification for Electrical Systems."

2.5 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.91.

B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

D. Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

E. Remove and replace units that do not pass tests or inspections and retest as specified above.

F. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of transformer connections.

1. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
2. Perform 2 follow-up infrared scans of transformers, one at 4 months and the other at 11 months after Substantial Completion.
3. Prepare a certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.

G. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.

B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.

C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 26 2200

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SECTION 26 2416

PANELBOARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Lighting and appliance branch circuit panelboards.

2. Power and distribution panelboards.

B. Related Sections include the following:

1. Section 26 2417 "Selection of Overcurrent Devices" for overcurrent protection program.

2. Section 26 2813 "Fuses".

1.3 DEFINITIONS

A. Panelette (Load Center): A panelboard with thermal magnetic molded case circuit-breaker branches, primarily of the plug-in type, designed for residential and light commercial projects, operating at 240 Volts and below, available in both single and 3-phase versions, and equipped with flush mounting trim.

B. Overcurrent Protective Device (OCD) (OCPD): A device operative on excessive current that causes and maintains the interruption of power in the circuit it protects.

1.4 SUBMITTALS

A. Product Data: For each type of panelboard, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:

a. Enclosure types and details for types other than NEMA 250, Type 1.

b. Bus configuration, current, and voltage ratings.

c. Short-circuit current rating of panelboards and overcurrent protective

devices.

d. UL listing for series rating of installed devices.

e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

C. Field Test Reports: Submit written test reports and include the following:

1. Test procedures used.

2. Test results that comply with requirements.

3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

D. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

E. Operation and Maintenance Data: Panelboards and components shall include maintenance manuals. In addition, include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, OCD's, components and accessories through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by Underwriters Laboratories Inc.

C. Comply with NEMA PB 1.

D. Comply with New York City Electrical Code.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:

1. Ambient Temperature: Not exceeding 104 degrees F (40 degrees C).

2. Altitude: Not exceeding 6600 feet (2000 m).

B. Service Condition: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperature within limits specified.

2. Altitude not exceeding 6600 feet (2000 m).

1.7 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Panelboards and Accessories:

a. Siemens Energy & Automation, Inc.

b. General Electric Co.; Electrical Distribution & Control Div.

c. Eaton Corp.; Cutler-Hammer Products.

d. Square D Co.

2.2 MANUFACTURED UNITS

A. Factory tests: Dielectric test, phase to phase and phase to ground, at twice the rated voltage plus 1,000 volts (1,500 volts minimum) for one minute. Date of test and the name and title of the individual certifying the test shall be indicated on a label affixed to the equipment.

B. Enclosures: Flush- and surface mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.

1. Outdoor Locations: NEMA 250, Type 3R.

2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.

3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

C. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

D. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

E. Directory Card: With transparent protective cover, mounted inside metal frame, inside

panelboard door.

F. Bus: Hard-drawn copper, 98 percent conductivity.

G. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

H. Main and Neutral Lugs: Type suitable for use with conductor material.

I. Feed-through Lugs: Type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

J. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.

K. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

L. Where wires or cables are used within panelboards to make up internal connections (factory installed or otherwise) such wire or cable shall have copper conductors only.

M. Where indicated or as required to assure ready accessibility of top switching and overcurrent device, they shall be arranged as multiple adjacent sections. A single overall cabinet shall be supplied for the multiple adjacent sections which constitute one panel. 1/4 inch (7 mm) minimum thickness plastic barriers having adequate angle iron framing support all around shall be included between sections. The entire assembly shall be such as to include wiring gutter space for each section as if it were an individual panelboard. Common bussing shall be arranged for adjacent sections unless there is indication that the individual sections are to be separately supplied. Sub-feed lugs with full capacity cable taps to adjacent panel sections will be accepted as the bussing method.

2.3 POWER OR DISTRIBUTION PANELBOARDS

A. Doors: Secured with vault-type latch with tumbler lock; keyed alike. Omit for fused-switch panelboards.

B. Main Overcurrent Protective Devices and Branch Overcurrent Protective Devices: as specified in Division 26, Section "Selection of Overcurrent Devices."

C. Cabinet: width and a depth adequate for a three pole branch device equal in rating to the panel mains. In no case shall the cabinet be wider than 42 inches (106 cm) or deeper than 18 inches (46 cm).

D. Product Description: NEMA PB 1, circuit breaker type and fusible switch type panelboard as required.

E. Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.

F. Minimum integrated short circuit rating: 65,000 amperes rms symmetrical. The final short circuit rating shall be as required due to available short circuit.

G. Fusible Switch Assemblies: NEMA KS 1, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Furnish interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate NEMA FU 1, Class R and J fuses.

H. Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Furnish circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

I. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1, circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.

J. Circuit Breaker Accessories: Trip units and auxiliary switches as indicated on Drawings.

K. Enclosure: NEMA PB 1, Type 1 cabinet box.

L. Cabinet Front: Surface door-in-door type, fastened with screws, hinged door with flush lock, metal directory frame, finished in manufacturer's standard gray enamel.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Concealed hinges, secured with flush latch with tumbler lock.

C. Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.

D. Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard; furnish insulated ground bus as indicated on Drawings.

E. Minimum Integrated Short Circuit Rating: 22,000 amperes rms symmetrical for 208 volt panelboards. The final short circuit rating shall be as required due to available short circuit.

F. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Drawings. Do not use tandem circuit breakers.

G. Enclosure: NEMA PB 1, Type 1

H. Cabinet Front: Flush or Surface (as indicated on drawings) cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock keyed alike. Finish in manufacturer's standard gray enamel.

2.5 PANELETTES - (LOAD CENTERS)

A. Gutter space: adequate space for connecting to all active and spare branches.

B. Cabinet width: not to exceed 16 inches (40 cm), including gutter space for the feeder cables which supply the panelette and pass through it.

C. Cabinet depth: not to exceed 4-1/2 inches (114 mm).

D. Manufacturer's label: stipulating its short circuit current rating as 100,000 amps on a "series connected" basis in conjunction with Class "T" fuses incorporated integrally Class "T" fuses and tenant main breakers incorporated in metering assemblies circuit breakers as specified in Division 26 Section "Selection of Overcurrent Devices".

E. Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.

F. Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard; furnish insulated ground bus as indicated on Drawings.

G. Minimum Integrated Short Circuit Rating: 100,000 amperes rms symmetrical for 208 volt panelboards. The final short circuit rating shall be as required due to available short circuit.

H. Molded Case Circuit Breakers for Panelettes:

1. ½ width-per-pole construction, dual and quad styles, MA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. With varying combinations from 15-30amps.

2. Rated type SWD for 15 and 20 amp.

3. Type HACR for air conditioning equipment circuits.

4. Class A ground fault interrupter circuit breakers as indicated on Drawings.

I. Enclosure: NEMA PB 1, Type 1

J. Cabinet Front: Flush or Surface (as indicated on drawings) cabinet front with concealed trim clamps, concealed hinge, metal directory frame. Finish in manufacturer's standard gray enamel.

2.6 OVERCURRENT PROTECTIVE DEVICES

A. As described in Division 26 Section "Selection of Overcurrent Devices".

2.7 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items as required for overcurrent protective device test, inspection, maintenance, and operation.

B. Switch and fuse units incorporated as part of panelboards shall be equipped with factory installed rejection clips to restrict fuses to types specified in Division 26 Section "Selection of Overcurrent Devices." Modify or replace in field any incorrect fuse clips.

C. Provide "lock-on" clips for the toggle handles of 5 percent of the branches in all lighting and appliance panels. Apply these clips to circuits supplying emergency battery units, night lights and others as directed in the field.

D. Furnish handle padlock attachments for 5 percent of the branches in lighting and appliance panels, and padlocks (with key) for 10 percent of these padlock attachments, but not less than 10 locks. Apply the padlock attachments to circuits (as directed in the field) for which the branch circuit device must be lockable in the "off" position in order to provide code-approved disconnect means.

2.8 PANELBOARD SHORT CIRCUIT RATINGS

A. Panelboards and Panelettes (load centers) shall bear U.L. labels attesting to the adequacy of the equipment to withstand and interrupt short-circuit currents not less than those available at their incoming terminals. Panels shall either be fully rated or shall be series rated in conjunction with integral or remote upstream devices in compliance with Division 26 Section "Selection of Overcurrent Devices". U.L. labels shall include size and type of allowable upstream and branch circuit devices and series connected ratings.

1. 120/208 volt lighting and appliance panels shall be "series connected rated" for not less than 150,000 amps where used in conjunction with appropriate upstream current limiting fuses, or optionally with main or upstream current limiting circuit breakers.

   a. Under the following circumstances, the required series ratings for lighting and appliance panels may be reduced below 150,000 amperes.

   b. For any lighting and appliance panels at which the available short circuit current has been reduced to less than 100,000 amps, the required series short circuit rating may be reduced to 100,000 amps. Submit short circuit calculations demonstrating compliance.

   c. Where the available short circuit current at the secondary service point is less than 95,000 amps, the required short circuit rating for all 120/208 volt lighting and appliance panels may be reduced to 125 percent of that available at the service point or 100,000 amps - whichever is less.

2. 120/208 volt power or distribution panels shall be fully rated for not less than 22,000 amps.

3. 120/208 volt lighting or appliance panels shall be "fully rated" for 10,000 amps except that panels supplied from transformers 225 KVA and larger shall be "fully rated" or "series connected" rated for not less than 22,000 amps.

B. Panelboard short circuit ratings shall comply with the following:

1. Distribution and power panels shall be "fully rated" for 200,000 amps when used

in conjunction with appropriate current limiting fuses as specified.

2. Distribution and power panels shall be "fully rated" for not less than 150,000 100,000 65,000 42,000 22,000 amps.

3. Lighting and appliance panels shall be "series connected rated" for not less than 150,000 amps where used in conjunction with appropriate upstream current limiting fuses, or optionally with main or upstream current limiting circuit breakers. Under the following circumstances, the required series ratings for lighting and appliance panels may be reduced below 150,000 amperes.

   a. For any lighting and appliance panels at which the available short circuit current has been reduced to less than 100,000 amps, the required series short circuit rating may be reduced to 100,000 amps. Submit short circuit calculations demonstrating compliance.

   b. Where the available short circuit current at the secondary service point is less than 95,000 amps, the required short circuit rating for all lighting and appliance panels may be reduced to 125 percent of that available at the service point or 100,000 amps - whichever is less.

4. Lighting and appliance panels shall be series rated for not less than 150,000 100,000 65,000 42,000 22,000 amps when used in conjunction with appropriate main or upstream current limiting or high interrupting capacity circuit breakers.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mount top of trim 74 inches (188 cm) above finished floor, unless otherwise indicated.

C. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Install overcurrent protective devices and controllers.

   1. Set field-adjustable switches and circuit-breaker trip ranges.

E. Install filler plates in unused spaces.

F. Stub four 1-inch (DN 25) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (DN 25) empty conduits into raised floor space or below slab not on grade.

G. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide

warning signs as specified in Division 26 Section "Electrical Identification."

B. Create a directory to indicate installed circuit loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems"

B. Connect wiring according to Division 26 Section "Low Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

B. Perform the following field tests and inspections and prepare test reports:

1. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.

2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.

3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.

4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scanning of each panelboard. Remove panel fronts so joints and connections are accessible to portable scanner.

1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

2. Record of Infrared Scanning: Prepare a certified report that identifies panelboards checked and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 CLEANING

A. In completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 26 2416

SECTION 26 2417

SELECTION OF OVERCURRENT DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

B. This Section includes all overcurrent protective devices (OCPD's) (OCD's) required for the project. It defines the type of OCPD required for each individually mounted device, panelboard, switchboard and miscellaneous device required.

C. Related Sections: The following Sections requirements relate to this Section:

1. Section 26 2816 "Enclosed Switches and Circuit Breakers"

2. Section 26 2813, Section "Fuses."

3. Section 26 2416 "Panelboards."

1.3 SUBMITTALS

D. General: Submit the following according to the Conditions of the Contract and Division 1 Specifications Section.

E. Descriptive data defining how the required short circuit ratings are met by the equipment furnished under the Related Sections described above. Include UL approval data from manufacturers for "series rated" combinations.

1.4 QUALITY ASSURANCE

F. Comply with NFPA 70, as amended by state and local codes.

G. Listing and Labeling: Products - as described with the Related Sections above are Underwriters Laboratories listed and labeled as defined in NFPA 70 Article 100. Where "series ratings" have been specified, listings attesting to these ratings is provided from UL or other nationally recognized testing laboratory.

PART 2 PRODUCTS

2.1 GENERAL

A. Refer to Related Sections listed hereinbefore for general product requirements.

B. Short circuit current ratings, and the manufacturer's labels attesting to these ratings (based on U.L. listings), are required for overcurrent protection devices, where they are

individually mounted (as fused switches or as fused switch bus duct plug-in devices), and for the equipment assemblies when they are incorporated in panels, switchboards, etc. Such ratings are in accordance with the following:-

1. In order to insure that they are at least equal to the available fault current, minimum ratings have been specified herein for the individual overcurrent device types, and in the pertinent sections for panelboards, switchboards and other assemblies or devices. Where "series connected ratings" have been specified for circuit breaker type panelboards (see appropriate specification section), these minimum ratings are in general based on the use of upstream fuses which have been specifically tested with the circuit breakers, and have been U.L. listed accordingly.

2. Where such fuse-circuit breaker series ratings are not available from a particular manufacturer, a current limiting circuit breaker may be utilized as the upstream device in order to obtain the required series rated. Such current limiting breakers are incorporated as main devices in the panelboards, as part of upstream panelboards, metering assemblies, or as individually mounted devices as the case may be. Where the required ratings can be met with main or upstream non-current limiting breakers having appropriate interrupting capacities, as approved by U.L., such arrangements will also be considered acceptable.

C. In advance of, or in conjunction with, the submission of shop drawings for approval, provide data defining in detail how the required short circuit current ratings specified elsewhere in these specifications are achieved with the equipment being furnished under the listed Related Sections. The data will, in narrative or graphic fashion, fully define how the various devices, individually, or in combination, comply with the "fully rated" or "series connected" short circuit current requirements. Include certifications from the manufacturer as to the U.L. approvals for these ratings for all proposed equipment.

2.2 APPLICATION

A. Overcurrent protective devices is provided in accordance with the schedule below. Abbreviations are understood to have the following meanings:

ABBREVIATION	DESCRIPTION
SW-BP	Bolted pressure switch
SW-QMQB	Quick-make, quick-break switch
/	Fusible (as part of switch abbreviation
CB-SMC	Standard molded case circuit breaker.
CLCB-MC	Current limiting circuit breaker - molded case
CB-CMC	Compact molded case circuit breaker

B. Select overcurrent protection devices as follows:

CATEGORY OF APPLICATION		DEVICE TYPE
Service disconnect unit individually mounted or in	(0-800 amps)	SW-QMQB/F

CATEGORY OF APPLICATION		DEVICE TYPE
switchboard		
	(above 800 amps)	SW-BP/F
Feeder unit in switchboard	(0-800 amps)	SW-QMQB/F
	above 800 amps)	SW-BP/F
Main or branch unit in 120/208 volt panel		CB-SMC
Main or branch unit in distribution panel or power panel		SW-QMQB/CF, except CLCB if needed for "series rating" for downstream lighting or appliance panel
Main unit in lighting or appliance panel		CB-SMC except CLCB-MC if needed for "series rating" of panel
Branch unit in lighting or appliance panel		CB-SMC
Main unit in metering assembly		QMQB/CF
Main unit in apartment panel		CB-SMC
Tenant main unit in metering assembly		CB-SMC
Branch unit in apartment panel		CB-CMC
Individually mounted unit		SW-QMQB except CLCB-MC if needed for series rating of downstream lighting or appliance panel.

2.3 QUICK-MAKE, QUICK-BREAK SWITCHES

A. Select quick-make, quick-break type distribution switches in accordance with the following:-

1. They equal or exceed the performance required for NEMA type H.D. horsepower rated switches.

2. They have arc quenchers and circuit breaker type pressure contacts.

3. Where intended for panelboard or switchboard mounting, they are of the "bolted-in" type.

4. They are designed for use only with Class "J" fuses up to 600 amps, and "Class L" fuses above 600 amps, and incorporate factory installed clips designed to insure

the use of proper fuses. Coordinate to insure that fuses supplied for the project match these fuse gaps.

2.4 STANDARD MOLDED CASE CIRCUIT BREAKERS

A. Select standard, molded case type circuit breakers in accordance with the following:-

1. Their tripping units are of the "thermal magnetic" type having bimetallic elements for time delay overload protection, and magnetic elements for short circuit protection.

2. Where no frame sizes are indicated, their interrupting capacities (in RMS symmetrical amperes) are not less than the following:-

Where Installed	Interrupting Capacity
120/208V lighting or appliance panel	20,000A

3. Where frame sizes are indicated, the interrupting capacities are no less than the following:-

INDICATED FRAME SIZE	MINIMUM ACCEPTABLE SYMMETRICAL AMPERES INTERRUPTING RATING IN RMS AMPERES
100	22,000
225	22,000
400	42,000
600	42,000
800	42,000

4. The minimum interrupting capacity in symmetrical RMS amperes of the circuit breakers intended for use in panelboards are as noted above. Where necessary in order to provide the U.L. approved "series connected" short circuit panel ratings specified elsewhere, (see "Panels for Light and Power" specification) breakers with higher interrupting capacities are provided as required.

5. They are of the "bolted-in" type.

6. They are equipped with 5 milliamp sensitivity ground fault interrupting features where so indicated, and/or where they supply standard convenience receptacles in bathrooms, kitchens and other such code mandated locations and with 30 milliamps sensitivity G.F.I. features where they supply piping tracing cables.

7. They are equipped with arc-fault interrupting features where so indicated, and/or where they supply 120 volt, single phase, 15- and 20-ampere outlets in dwelling unit bedrooms (and sleeping areas of studio apartments).

8. Where single pole in trip sizes 20 amps or less, they are rated for switching duty.

2.5 CURRENT LIMITING CIRCUIT BREAKERS

A. If required to provide "series connected" ratings (as specified elsewhere) where fuse-breaker ratings have not been listed by U.L., selected molded case type current limiting circuit breakers in accordance with the following:-

1. In frame sizes up to 400 amps, they are each of the fuseless type and have an interrupting capacity of 200,000 amps symmetrical at 120/208 (240) volts.

2. In frame sizes larger than 400 amps, they are each consisting of a molded case circuit breaker with a current limiting fuse connected in each pole, as noted below:-

a. Their fuses are equipped with release buttons arranged to trip open the latches of their circuit breaker elements.

b. Sizing of the fuses are as directed.

c. Each has its fuses and breaker elements integrally mounted in a single overall molded phenolic plastic case.

2.6 FUSES

A. Refer to Division 26, Section 262813 "Fuses" for additional requirements.

B. Select fuses in accordance with the following:

1. Regardless of the actual available fault current they are, at full recovery voltage, be capable of safely interrupting fault currents of 200,000 amperes RMS symmetrical deliverable at the line side of the fuse.

2. They are suitable for application to fuse gaps which reject other types of fusing. Coordinate with supplier(s) of all fusible switch units (in panels, switchboards, etc.) for the project to insure that fuse gaps match the specified fuse types.

3. Except as noted hereinafter, in sizes up to 600 amps, they are of the Class "J" time delay type, capable of carrying 500 percent of rated current for not less than 10 seconds and U.L. listed as a "Class J" fuse. Fuses are Shawmutt Type "AJT", Bussmann Type "LPJ", or other approved. Approval is contingent on certified test data demonstrating full compliance with the following requirements:-

a. Fuse carries 500 percent of rating for at least 10 seconds.

b. Fuse suitable for motor feeders when applied at 150 percent of motor full load current.

c. Fuse selectivity with downstream fuses is:-

1) 2:1 with "J" time delay

2) 3:1 with "RK-5" time delay

3) 2:1 with "RK-1" time delay

4. Where intended for use in motor starters (individual, or in motor control centers) they are of the dual element time delay type, U.L. listed as "Class RK-5", and capable of carrying 500 percent of rating for at least 10 seconds. Utilize "Class RK-1" time delay fuses where required to insure coordination with upstream fuses.

5. Except as noted hereinafter, in sizes over 600 amps, they are of the current limiting type, U.L. listed as "Class L".

6. Where protecting a feeder or tap supplying a single large motor, fuses in the range of 800 to 2000 amps have special "Class L" time delay characteristics equal to Shawmutt Type "A4BT" or Bussmann Type "KRP-C" fuses.

7. Fuses to be used in current limiting circuit breakers, regardless of actual available fault current, at full recovery voltage, are capable of safely interrupting fault currents in the order of 200,000 amperes RMS symmetrical of 280,000 amperes RMS asymmetrical. The current limiting fuses coordinate with and back up the circuit breakers they are associated with so that all fault overload currents occurring within the safe capability of the breakers cause the breakers to open, and all currents occurring beyond the safe capability of the breakers cause the fuses to open; the opening of fuses being such as to prevent damage to any circuit breaker component parts. Where directed, fuses are reduced in size so as to provide backup protection for downstream overcurrent devices.

2.7 COMPACT MOLDED CASE CIRCUIT BREAKERS

A. Select compact molded case breakers in accordance with the following:-

1. They consist of manually operated quick-make, quick-break mechanically trip free operating mechanisms for simultaneous operating of all poles, with contacts, and trip elements for each pole, all enclosed in molded phenolic plastic cases. Trip units for these breakers are of the "thermalmagnetic" type having bimetallic elements for time delay overload protection and magnetic elements for short circuit protection.

2. They have an interrupting rating of at least 10,000 amperes RMS asymmetrical.

3. They are of a type capable of being used with main devices incorporated in the panelette, or upstream devices, to establish the required series rated short circuit capability indicated elsewhere.

4. They may be of the plug in type but are arranged for tamper resistant mounting to prevent the interchange of breakers having trip sizes outside of prescribed ranges.

5. They are equipped with 5 milliamp ground fault interrupting features where so indicated or where required by code.

6. They are equipped with arc-fault interrupting features where so indicated, and/or where they supply 120 volt, single phase, 15- and 20-ampere outlets in dwelling unit bedrooms (and sleeping areas of studio apartments).

PART 3 EXECUTION

3.1 GENERAL

A. Comply with the requirements of Division 26, Section 262816 " Enclosed Switches", , Section 262813 "Fuses," and Section 262416 "Panelboards".

END OF SECTION 26 2417

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SECTION 262500 – ROOF SNOW MELTING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes electric heating cables for snow and ice melting on roof. System shall consist of equipment and materials for complete snow melting system.
   1. Self-regulating, parallel resistance.

1.2 RELATED SECTIONS

A. LEED Submittals – Section 013329.

B. LEED Requirements 0 Section 018113.

C. Environmental Practices – Section 018116.

D. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

E. 075200 – Modified Bitumen Roofing

F. Roof Specialties and Accessories – Section 077100.

G. Common Work Results for Electrical - Section 260500.

1.3 COORDINATION

A. Coordinate with roofing contractor installation of heating cable to the roof

B. The electrical contractor shall be responsible for all laying heating cables, power and signal cable wiring, controllers, relays, activation devices and system testing, quality assurance and demonstration of the system.

1.4 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each type of product indicated.

   1. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.

B. Shop Drawings: Submit drawings showing layout of system relay panel, activation device, grounding connections, and heating cables required to provide complete operating system. including the following:

1. Locations for activation devices.
2. Locations of relay panel, junction boxes, feeder wires, and load wires.
3. Circuit feeder runs from relay panel / junction box to heating element connection points.
4. Heating element layout and spacing.
5. Locations were heating element will cross joints, jumper locations.
6. Connection points between circuit feeders and heating element.
7. Wiring between relay panel and activation device.
8. Location of aerial or pavement mounted temperature moisture sensor(s).
9. Differentiate between:
   a. Control wiring.
   b. Heating element.
   c. Cold Lead.
   d. Branch-circuit wiring.
10. Differentiate between zones of heating element.

C. Field quality-control test reports.

D. Operation and maintenance data: Submit manufacture's written maintenance and operating expenses

E. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. National Electrical Code NEC, Requirements of the New York City Code and CSA and UL Standards.

B. Installer Qualifications:
   1. Licensed Electrical Contractor with a minimum of three years successful certified experience installing projects utilizing electric heating cable systems equal to systems specified in this section.

C. Manufacturer's Qualifications:
   1. Firm regularly engaged in manufacturing of electric cable heating elements, of type, sizes, and ratings required, whose products have been in satisfactory use in similar services for not less than five years.

D. Regulatory Requirements:
   1. Comply with applicable local electrical code requirements of local authorities having jurisdiction.
   2. Provide products that are listed or recognized and labeled by Nationally Recognized
   3. Testing Laboratory (NRTL) that includes, but not limited to :
      a. ETL subsidiary of Intertek Testing Laboratories,
      b. Canadian Standards Association (CSA), and
      c. Underwriters Laboratories (UL).
   4. Conform to requirements of "Standard for Electric Space Heating Cables" (UL – 1673, 2nd Edition, dated May 30, 1996).
   5. Conform to "Requirements for Electrical Resistance Heating Cables and Heating Device Sets" (CSA – 22.2, No 130-03, dated January, 2008)

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle in accordance with manufacturer's written instructions. Store materials in dry indoor location off the ground.

B. Remove damaged materials from job site and replace with new at no additional cost to owner.

1.7 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Cable heating element **10** years from date of Substantial Completion.

2. Relay Panel and Activation Device- One year

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. The system shall consist of all equipment and materials for a complete snow melting system to be installed as described in Contract Documents.

B. The area covered and heat density (measured by Watts or BTU equivalent) per linear foot of heating element or square foot of area for each product are determined by the heat output of cable and the spacing between adjacent runs of heating element. See manufacturer's installation instructions for more detailed information.

C. The extent of the snow and ice melting system is as shown on specification sheets and architectural drawings. Whenever possible, The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) design criterion should be followed. Control Joints shall be identified and marked for jumpers.

2.2 SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Heatizon
2. Delta-Therm Corporation.
3. Raychem; a division of Tyco Thermal Controls.

B. Heating Element
1. Shall consist of two (2) 16 AWG nickel-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature all along its length, allowing the heating cable to be cut to length in the field. A radiation-cross-linked modified polyolefin dielectric jacket shall cover the heating cable. To provide a ground path and to enhance the heating cable's ruggedness, the heating cable shall have a

braid of tinned copper (-C), as required per section 427-23 of the NEC-2008. An ultraviolet stabilized weatherproof over-jacket composed of: modified polyolefin shall cover the grounding braid. The cable shall be suited for use on concrete, wood, plastic, and asphalt building materials.

2. For energy efficiency and in order to provide heat output that is sufficient for snow melting, the heating cable shall have a nominal rating, in correlation with selection of the heating cable, of 5, 9, or 12 watts per lineal foot in Ice Water @ 32°F.
3. The heating cable shall operate on line voltages of 208 volts, single phase
4. Power connection, end seal, and splice kit components shall be supplied by manufacturer and applied in the field.

C. A ground-fault device for equipment protection, rated at 30-mA trip, shall protect heating cable circuit. This requirement is in accordance with Article 426 of the NEC-2008.

D. Relay Panel
1. Relay Panel accommodating 4 circuits to be used to join multiple circuits in conjunction with the same activation scheme.

E. Activation
1. All cable circuits shall be activated by a approved furnished by the system supplier
2. An automatic snow/ice sensor which detects precipitation occurring at temperatures below 38° F (4 ° C). aerial mounted sensors. Coordinate location with project manager and Architect.
3. Multiple Circuits: Where the rating of the activator would be exceeded, it shall be used in conjunction with a Relay Panel for activation of multiple heater circuits.

2.3 ACCESSORIES

A. Cable Installation Accessories: Cable holding clips, silicone end seals and splice kits, and installation clips all furnished by manufacturer, or as recommended in writing by manufacturer.

B. Cable mounting clips: Cable mounting clips shall be aluminum or stainless steel adhered to the roof membrane with asphaltic glue adhesive approved for use by roof membrane manufacturer. Spacing of clips to be provided as indicated on Shop drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where heating element is to be installed for proper installation, cleanliness, or condition that may hinder successful installation of snow melt system.
1. Notify Contractor in writing of items needing correction.
2. Do not install snow melt system until faulty conditions are corrected.

3.2 INSTALLATION

A. Interface with Other Work: Coordinate with roofing contractor installation of heating cable to the roof

B. The electrical contractor shall be responsible for all power and signal cable wiring, controllers, relays, activation devices and system testing, quality assurance and demonstration of the system.

C. The current Cable Installation Manual shall be considered as part of this specification.

D. Cable sheaths shall not touch or cross one another nor shall the heating portion of cables cross expansion joints.

E. Manufacturer supplied cable Jumpers shall be used when expansion joints are required in the system design.

F. Cables are to be installed at the specified spacing and in accordance with manufacturer's recommended ASHRAE Snow Melting Requirements. Spacing should not be greater than 9 inches to ensure reasonably uniform distribution of heat.

G. All junction boxes shall be located in accessible areas. Junction boxes shall not be located in the heated slab, but shall be located above grade level. Covers shall be kept on boxes when not being accessed.

H. All terminations shall be protected from the weather and from physical damage and bonded to the system ground.

I. Any field alternations or deviations shall proceed only after authorization has been issued by Project Manager. All changes shall be accurately recorded by the contractor and shall be turned over to the engineer upon completion of the heating system scope of work.

3.3 FIELD QUALITY CONTROL

A. A. Testing as directed by system manufacturer.
   1. 1. Field testing of insulation resistance and continuity of the units shall be carried out with
      a. 2500VDC Megohmmeter insulation tester and recorded by the Electrical Contractor.
   2. 2. Testing shall be performed by the Electrical Contractor done in the following order:
      a. Prior to Installation of Heating Cable
      b. After Installation of Heating Cable on Substrate.
   3. Verify that all heating element is completely embedded.

3.4 RESISTANTANCE RECORDING

A. Insulation resistance shall be consistently not less than 20 megohms during each test.

B. A complete system startup shall be performed to verify successful operation.

C. Resistance readings shall be recorded in the Hott-Wire® SR Cable Design and Installation Manual

3.5 DEMOSTRATION

A. Provide adequate demonstration and training to Owner in operation and maintenance of system.

END OF SECTION 238313

SECTION 262713 - ELECTRICITY METERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes equipment for electricity metering by utility company.

1.3 DEFINITIONS

A. KY Pulse: Term used by the metering industry to describe a method of measuring consumption of electricity that is based on a relay opening and closing in response to the rotation of the disk in the meter.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For electricity-metering equipment.

1. Dimensioned plans and sections or elevation layouts.
2. Wiring Diagrams: For power, signal, and control wiring. Identify terminals and wiring designations and color-codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. 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.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Architect and Construction Manager, no fewer than seven days in advance of pro-

posed interruption of electrical service.

2. Do not proceed with interruption of electrical service without Architect's and Construction Manager's written permission.

1.7 COORDINATION

A. Electrical Service Connections: Coordinate with utility companies and components they furnish as follows:

1. Comply with requirements of utilities providing electrical power services.
2. Coordinate installation and connection of utilities and services, including provision for electricity-metering components.

PART 2 - PRODUCTS

2.1 EQUIPMENT FOR ELECTRICITY METERING BY UTILITY COMPANY

A. Meters will be furnished by utility company.

B. Current-Transformer Cabinets: Comply with requirements of electrical-power utility company.

C. Meter Sockets: Comply with requirements of electrical-power utility company.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with equipment installation requirements in NECA 1.

B. Install meters furnished by utility company. Install raceways and equipment according to utility company's written requirements. Provide empty conduits for metering leads and extend grounding connections as required by utility company.

3.2 IDENTIFICATION

A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

1. Series Combination Warning Label: Self-adhesive type, with text as required by NFPA 70.
2. Equipment Identification Labels: Adhesive film labels with clear protective overlay. For residential meters, provide an additional card holder suitable for printed, weather-resistant card with occupant's name.

END OF SECTION 26 2713

SECTION 26 2726

WIRING DEVICES

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.

1.2 SECTION INCLUDES

A. Wall switches.

B. Wall dimmers.

C. Receptacles.

D. Device plates and decorative box covers.

E. Floor box service fittings.

F. Access floor boxes.

1.3 REFERENCES

A. NEMA WD 1 - General Purpose Wiring Devices.

B. NEMA WD 2 - Semiconductor Dimmers for Incandescent Lamps.

C. NEMA WD 6 - Wiring Device Configurations.

D. Section 01015 – VOC Limits for Adhesives, Sealants and Architectural Coatings.

E. Section 01511 – Construction IAQ Management.

F. Section 01000 - General Conditions

G. Addendum to General Conditions

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions,

colors, and configurations.

B. Samples: Submit one sample of each type device and cover plate.

C. Manufacturer's Instructions:

1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.

2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

A. Description:

TOGGLE SWITCHES: NEMA WD 1, heavy-duty, AC only general-use, quiet type snap switch with fast make-slow break, silver-cadmium oxide alloy contacts, side and back wired.

ROCKER SWITCHES: NEMA WD 1, AC general use only, extra quiet type rocker switch with fast make, slow break contacts , side and back wired.

B. Device Body: White plastic with white plates, black plastic with stainless steel

plates with matching switch handle.

C. Illuminated Handle Type Switch: To match device body.

D. Pilot Light: lighted handle type switch, red polycarbonate handle.

E. Voltage Rating: 120-277 volts, A.C.

F. Current Rating: 20 amperes.

G. Manufacturers and Model Numbers:

1. Single-pole switch:

   a. Lutron Nova-T model NT-1PS-SN or approved equal by Leviton os Hubbel.

   b. Substitutions: Approved equal.

2. Double-pole switch:

   a. Lutron Nova-T multi gang or equal by Leviton or Hubbell.

   b. Substitutions: Approved equal.

3. Three-way switch:

   a. Lutron Nova-T model NT-3PS-SN or approved equal by Leviton or Hubbell.

   b. Substitutions: Approved equal.

4. Four-way switch:

   a. Lutron Nova-T model NT-4PS-ST or approved equal by Leviton or Hubbell.

   b. Substitutions: Approved equal.

2.3 RECEPTACLES

A. Description: NEMA WD1, heavy duty general-use receptacle.

B. Device Body: White plastic with white plates, black plastic with stainless steel plates.

C. Configuration: NEMA WD6, type as specified and indicated.

D. Convenience Receptacle: Type 5-20R.

E. Construction:

1. Nylon housing.

2. Brass contacts.

3. Solid Center rivet.

4. Back and side wiring type.

F. Manufacturers and Model Number:

1. Duplex convenience receptacle:

a. Lutron Nova-T model NTR-20-ST or approved equal by Leviton or Hubbell.

b. Substitutions: Approved equal.

2. GFCI receptacle:

a. Lutron Nova-T model NTR-20-GFCI-ST or approved equal by Leviton or Hubbell.

b. Substitutions: Approved equal.

4. Special receptacle:

a. Type as identified by NEMA standard number on drawings.

2.4 WALL PLATES

A. Decorative Cover Plate: Screwless white and stainless steel (at locations as shown on the architectural drawings) Lutron Nova-T or approved equal by Leviton or Hubbell.

1. Substitutions: Approved equal.

B. Weatherproof Cover Plate: Gasketed cast metal with [hinged] gasketed device cover.

1. Hubbell

2. Leviton

3. Arrow-Hart

4. Substitutions: Approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify outlet boxes are installed at proper height.

B. Verify wall openings are neatly cut and will be completely covered by wall plates.

C. Verify floor boxes are adjusted properly.

D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring device.

E. Verify openings in access floor are in proper locations.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surfaces.

B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

E. Do not share neutral conductor on load side of dimmers.

F. Install receptacles with grounding pole on bottom or right-hand side.

G. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

I. Connect wiring devices by wrapping conductor around screw terminal.

J. Use jumbo size plates for outlets installed in masonry walls.

K. Install galvanized steel plates on outlet boxes and junction boxes in unfurnished areas, above accessible ceilings, and on surface mounted outlets.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Install wall switch 48 inches above finished floor.

B. Install convenience receptacle 24 inches above finished floor.

C. Install convenience receptacle 6 inches above counter.

D. Install dimmer 48 inches above finished floor.

E. Install telephone jack 24 inches above finished floor.

F. Install telephone jack for wall telephone 48 inches above finished floor.

3.5 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

END OF SECTION 26 2726

SECTION 26 2813

FUSES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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. This Section includes cartridge fuses, rated 600 V and less, for use in switches, switchboards, controllers and spare fuse cabinets.

1.3 SUBMITTALS

A. Product Data: Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings for each fuse type indicated.

B. Product Data: Include the following for each fuse type indicated:

1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.

2. Let-through current curves for fuses with current-limiting characteristics.

3. Time-current curves, coordination charts and tables, and related data.

4. Fuse size for elevator feeders and elevator disconnect switches.

C. Maintenance Data: For fuses to include in emergency operation and maintenance manuals.

1. In addition to terms specified in Division 1 Section "Operation and Maintenance Data", include the following:

a. Let-through current curves fuses with current-limiting characteristics.

b. Time-Current curve, coordination charts and tables, and related data.

1.4 QUALITY ASSURANCE

A. Source Limitations: Provide fuses from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NEMA FU 1.

D. Comply with NYC Electrical Code.

1.5 PROJECT CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F ((4.4 deg C)) or more than 100 deg F ((38 deg C)), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.6 COORDINATION

A. Coordinate fuse ratings with HVAC and refrigeration equipment nameplate limitations of maximum fuse size.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged in original cartons or containers and identified with labels describing contents.

1. Fuses: Quantity equal to 10 percent of each fuse type and size, but not fewer than 3 of each type and size.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Bussman, Inc.

2. Eagle Electric Mfg. Co., Inc.; Cooper Industries, Inc.

3. Ferraz Shawmut.

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.

2.3 SPARE FUSE CABINET

A. Cabinet: Wall-mounted, 0.05-inch- (1.27-mm-) thick steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.

1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.

2. Finish: Gray, baked enamel

3. Identification: "SPARE FUSES" in 1-1/2-inch ((40-mm)) high letters on exterior of door.

4. Fuse Pullers: For each size fuse.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

B. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

A. Refer to Division 26, Section 262417 "Selection of Overcurrent Devices" for Determination of Fuse Types for Installation Throughout the Distribution System.

3.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

B. Install spare fuse cabinets.

3.4 IDENTIFICATION

A. Install labels indicating fuse replacement information on inside door of each fused switch.

END OF SECTION

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SECTION 26 2816 - ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of NRTL listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Qualification Data: For qualified testing agency.

D. Field quality-control reports.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

E. Manufacturer's field service report.

F. Operation and Maintenance Data: Enclosed switches shall include emergency, operation, and maintenance manuals. In addition, include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain enclosed switches, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
2. Altitude: Not exceeding 6600 feet (2010 m).

1.7 COORDINATION

A. Coordinate layout and installation of switches and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.8 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
2. Fuse Pullers: Two for each size and type.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.
5. Approved Equal

B. Type HD, Heavy Duty, Six Pole, Single Throw, 240V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.2 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
1. Outdoor Locations: NEMA 250, Type 4X, stainless steel.
2. Indoor Locations: NEMA 250, Type 1, galvanized steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Install fuses in fusible devices.

D. Comply with NECA 1.

3.3 IDENTIFICATION

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

D. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.
    c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

E. Enclosed switches will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports, including a certified report that identifies enclosed switches and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 26 2816

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SECTION 26 3600 - AUTOMATIC TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes automatic transfer switches rated 600V and less.

1.2 SUBMITTALSs

A. Product Data: Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

1. Dimensioned Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

2. Detailed description of equipment anchorage devices on which the certification is based.

C. Field quality-control test reports.

D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. 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.

B. Comply with NEMA ICS 1.

C. Comply with NFPA 70.

D. Comply with NFPA 110.

E. Comply with UL 1008 unless requirements of these Specifications are stricter.

1.4. DESCRIPTION OF SYSTEM

A. Provide an automatic transfer switch that will initiate a signal on primary power failure and automatically detect a secondary power source, transferring the load to this secondary source. On restoration of primary power, the switch must automatically retransfer the load back to primary power and signal the secondary

source to shut down. The switch must be a self contained device with all features described herein.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

A. The transfer switch must be UL listed for use in emergency systems.

PART 2 - AUTOMATIC TRANSFER SWITCH

2.1. MANUFACTURERS

A. Emerson; ASCO Power Technologies, LP.
B. Generac Power System, Inc., Guardian Elite
C. Onan/Cummins Power Generation; Industrial Business Group.
D. Other approved equal.

2.2 GENERAL TRANSFER SWITCH PRODUCT REQUIREMENT

A. The automatic transfer switch shall be furnished by the manufacturer of the engine-generator set so as to maintain system compatibility and local service responsibility for the complete emergency power system. It shall be UL listed by Underwriter's Laboratory, Standard 1008 with fuse or circuit breaker protection. Representative production samples of the transfer switch supplied shall have demonstrated through tests the ability to withstand at least 10,000 mechanical operation cycles. One operation cycle is the electrically operated transfer from normal to emergency and back to normal. Wiring must comply with NEC table 312.6. The manufacturer shall furnish schematic and wiring diagrams for the particular automatic transfer switch and a typical wiring diagram for the entire system.

2.3 RATINGS & PERFORMANCE

A. The automatic transfer switch shall be a 3 pole design rated for 200 amps continuous operation in ambient temperatures of -20 degrees Fahrenheit (-30 degrees Celsius) to +140 degrees Fahrenheit (+60 degrees Celsius). Main power switch contacts shall be rated for 600 V AC minimum. The transfer switch supplied shall have a minimum withstand and closing rating when fuse protected of 200,000 amperes. Where the line side overcurrent protection is provided by circuit breakers, the short circuit withstand and closing ratings shall be 42,000 amperes RMS. These RMS symmetrical fault current ratings shall be the rating listed in the UL listing or component recognition procedures for the transfer switch. All withstand tests shall be performed with the overcurrent protective devices located external to the transfer switch.

2.4 CONSTRUCTION

A. The transfer switch shall be double throw construction, positively electrically and mechanically interlocked to prevent simultaneous closing and mechanically held in both normal and emergency positions. Independent break before make action shall be used to positively prevent dangerous source to source connections. When switching the neutral, this action prevents the objectionable ground currents and nuisance ground fault tripping that can result from overlapping designs. The transfer switch shall be approved for manual operation. The electrical operating means shall be by electric solenoid. Every portion of the contactor is to be positively

mechanically connected. No clutch or friction drive mechanism is allowed, and parts are to be kept to a minimum. This transfer switch shall not contain integral overcurrent devices in the main power circuit, including molded case circuit breakers or fuses.

B. The transfer switch electrical actuator shall have an independent disconnect means to disable the electrical operation during manual switching. Maximum electrical transfer time in either direction shall be 160 milliseconds, exclusive of time delays. Main switch contacts shall be high pressure silver alloy with arc chutes and separate arcing contacts to resist burning and pitting for long life operation.

2.4 CONTROLS

A. All control equipment shall be mounted on the inside of the cabinet. Control boards shall have installed cover plates to avoid shock hazard while making control adjustments. The solid state voltage sensors and time delay modules shall be plug-in circuit boards with silver or gold contacts for ease of service.

B. A solid state undervoltage sensor shall monitor all phases of the normal source and provide adjustable ranges for field adjustments for specific application needs. Pick-up and drop-out settings shall be adjustable from a minimum of nominal -25 volts to a maximum of nominal -5 volts.

C. Signal the engine-generator set to start in the event of a power interruption. A solid state time delay start, adjustable, 0 to 60 seconds, shall delay this signal to avoid nuisance start-ups on momentary voltage dips or power outages. Provide a two (2) wire shielded cable (RS485+/-) with ground from transfer switch to generator connection box for low voltage control link of generator controller.

D. Transfer the load to the engine-generator set after it reached proper voltage, adjustable from 85-95% of system voltage, and frequency, adjustable from 85-95% of system frequency. A solid state time delay, adjustable from 0 seconds to 1200 seconds, shall delay this transfer to allow the engine-generator to warm-up before application of load.

E. Retransfer the load to the line after normal power restoration. A return to utility timer, adjustable from 1-30 minutes, shall delay this transfer to avoid short term normal power restoration.

F. The operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred. Controls shall provide an automatic retransfer of the load from emergency to normal if the emergency source fails with the normal source available.

G. Signal the engine-generator to stop after the load retransfers to normal. A solid state engine cooldown timer, adjustable from 0-1200 seconds, shall permit the engine to run unloaded to cooldown before shutdown. Should the utility power fail during this time, the switch will immediately transfer back to the generator.

H. Provide an engine minimum run timer, adjustable from 5-30 minutes, to ensure an adequate engine run period.

I. Provide a solid state plant exerciser. It must allow selection of any combination of days of the week and the time of day for the generator set exercise period. Clock shall have a one week cycle and be powered by the load side of the transfer switch. A battery must be supplied to maintain the circuit board clock operation when the load side of the transfer switch is de-energized. Control shall allow option to transfer load to the engine-generator set during the exercise period.

J. The transfer switch shall have a time delay neutral feature to provide a time delay, adjustable from 0-10 seconds, during the transfer in either direction, during which time the load is isolated from both power sources. This allows residual voltage components of motors or other inductive loads (such as transformers) to decay before completing the switching cycle. Control shall allow bypass of all transition features when immediate transfer is required.

K. The transfer switch shall have an in-phase monitor which allows the switch to transfer between live sources if their voltage waveforms become synchronous within 20 electrical degrees within 10 seconds of transfer initiation signal. A switch must be provided to bypass this feature if not required.

L. If the in-phase monitor will not allow such a transfer, the control must default to time delay neutral operation. Switches with in-phase monitors which do not default to time delay neutral operation are not acceptable.

M. Front mounted controls shall include a selector switch to provide for a NORMAL TEST mode with full use of time delays, FAST TEST mode which bypasses all time delays to allow for testing the entire system in less than one minute, or AUTOMATIC mode to set the system for normal operation.

N. Provide LEDs to indicate the transfer switch position in either UTILITY (green) or GENERATOR (green). Provide LEDs to indicate the source available in either UTILITY AVAILABLE (green) or STANDBY OPERATING (amber). These lights must be energized from utility or the engine-generator set.

O. Provide manual operating handle to allow for manual transfer. This handle must be mounted inside the lockable enclosure so accessible only by authorized personnel.

P. Provide a maintenance disconnect switch to prevent load transfer and automatic engine start while performing maintenance. This switch will also be used for manual transfer switch operation.

2.5 MISCELLANEOUS TRANSFER SWITCH EQUIPMENT

A. The transfer switch mechanism and controls are to be mounted in a NEMA 3R enclosure.

PART 3 - ADDITIONAL PROJECT REQUIREMENTS

3.1. APPLIED STANDARDS

A. The transfer switch must be UL listed and carry the UL mark for use in emergency

systems.

3.2 FACTORY TESTING

A. Before shipment of the transfer switch shall be tested under operating conditions for performance and proper functioning of control and interfacing circuits. Tests shall include:

1. Verify all timing sequences operate properly and are set to factory settings.

2. Verify the transfer mechanism operates properly.

3. Verify all manual operations and indicators are functioning properly.

3.3 OWNER'S MANUALS

A. Three (3) sets of owner's manuals specific to the product supplied must accompany delivery of the equipment. General operating instruction, preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model must be included.

3.4 SERVICE

A. Supplier of the electric plant and associated items shall have permanent service facilities in this trade area. These facilities shall comprise a permanent force of factory trained service personnel on 24 hour call, experienced in servicing this type of equipment, providing warranty and routine maintenance service to afford the owner maximum protection. Delegation of this service responsibility for any of the equipment listed herein will not be considered fulfillment of these specifications. Service contracts shall also be available.

PART 4 - REMOTE ANNUNCIATOR
4.1 GENERAL

A. Provide and install Remote Annunciator for monitoring and control of transfer switches remotely over Ethernet.

4.2. HARDWARE SPECIFICATIONS

A. The Remote Annunciator shall be listed to cUL-60950-1 and UL 1008 and include the following features and ratings:

1. User-configured labels with ATS names and power sources

2. Dual 10/100 Base-T auto sensing and auto crossover Ethernet ports

3. LED indication of source acceptability, switch position, common alarm, time delay and Ethernet link activity

4. Push button for transfer/retransfer control operations and time delay bypass

5. Push buttons for Alarm Silence and Lamp Test

6. Key lock to enable and disable the transfer push button

7. Audible and visual alarm to indicate Communication Error ATS Locked Out Failure to Synchronize Extended Parallel and any of the 8 user-configured discrete inputs

8. Programmable watchdog timer that can generate a system reset upon timeout (min 1 sec)

9. Factory reset capability

10. 100 ms power ride-through

4.3. SOFTWARE SPECIFICATION

A. The Remote Annunciator shall contain embedded web pages accessible via various web browsers with the following capabilities:

1. Configuration for protocol and communications management with the ability of auto discovering transfer switches on network

2. Ability to create and print customized labels for ATS names and power sources

3. The ability to choose a continuous or periodic audible alarm with customizable interval time

4. Ability to configure up to 8 discrete inputs as alarms

5. View detailed packet status counters i.e. transmitted received and dropped packets with the ability to reset counters

6. ATS source name configuration page which allows users to configure power source names and print labels

7. Upgrade firmware locally without interfering with installation

4.4. COMMUNICATIONS

A. Dual 10/100 Base-T (RJ-45) Ethernet ports are provided to support TCP/IP communications for up to eight transfer switches via individual remote connectivity modules or daisy-chained serial modules into a single connectivity module. Additional features include:

1. Supports Full Duplex Flow Control (IEEE 802.3x)

2. 3.3V power supply with 5V I/O tolerance

3. Supports 3 LED's to indicate traffic link speed and collision

4.5. MOUNTING

A. The Remote Annunciator is suitable for:

1. Surface mounting using mounting screws studs

2. Flush Mount from behind a cutout section (Enclosure Door Mounting)

3. Flush Mount from the front of a cutout section (Enclosure Door Mounting)

4.6. POWER SUPPLY

A The Remote Annunciator shall be capable of accepting 24VDC 120 VAC or 240 VAC power source. 120VAC power source circuited to the emergency panelboard shall be utilized.

4.7. ENVIRONMENTAL

A The remote annunciator shall have an Ambient Operating Temperature range of -4 to 158 ° F (-20 – +70 ° C) @ 5~85% humidity and Ambient Storage Temperature of -40 ° to 185 ° F (-40 ° to 85 ° C).

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SECTION 265000

ARCHITECTURAL LIGHTING

PART 1 – GENERAL

1.01 DESCRIPTION

A. General: Provide architectural lighting in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Lighting Control Equipment

B. Emergency Lighting

1.03 DEFINITIONS

A. Fixture: The elements of a luminaire that are designed to distribute the light, and to position and protect the lamps.

B. Luminaire: A complete lighting unit consisting of a lamp or lamps and ballasting (when applicable) together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply.

C. Lighting Unit: A fixture or an assembly of fixtures with a common support, including a pole or bracket plus mounting and support accessories.

D. Average Life: The time after which 50 percent of the lamps fail and 50 percent of the lamps survive under normal conditions.

1.04 QUALITY ASSURANCE

A. Fixture Materials: Provide fixture parts and components that are constructed of materials most appropriate to their use or function, and that are resistant to corrosion in a marine environment and mechanical stresses encountered in the normal application and function of the fixtures.

B. Manufacturers: Provide fixtures from manufacturers making like products for not less than three years prior to bid.

C. Electrical Component Standard: Provide components that comply with NFPA 70 and that are listed and labeled by UL.

D. Listing and Labeling: Provide fixtures and accessory components specified in this Section that are listed and labeled for their indicated use and installation conditions on Project.

1. Special Listing and Labeling: Provide fixtures for use in damp or wet locations, underwater, and recessed in combustible construction that are specifically listed

and labeled for such use. Provide fixtures for use in hazardous (classified) locations that are listed and labeled for the specific hazard.

2. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

3. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

E. Applicable Codes: Fixtures shall be made and installed in accordance with the current version of the National Electric Code, the Uniform Building Code, the Federal Occupational Safety & Health Act, local codes and any other applicable regulations.

F. Measuring and Testing Equipment: Instruments for the measurement of voltage, luminaire temperature, lighting level and fixture brightness level shall be available at all times on the site.

1.05 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, unless noted otherwise. Contractor shall be allowed one initial submission and one resubmission to meet all specification requirements.

B. Product Data: Fixtures, lamps, ballasts and poles or other mounting components. Arrange Product Data for fixtures in order of fixture designation. Include data on features and accessories and the following:

1. Outline drawings indicating dimensions and principal features of fixtures.

2. Electrical Ratings and Photometric Data: Certified results of independent laboratory tests for fixtures and lamps. Provide data for the specified lamp or lamp/ballast combination.

C. Provide data as required to demonstrate that the submitted product meets or exceeds the performance of the specified fixture.

1. Include photometric data charts: C.U., candlepower distribution and/or luminance information as necessary.

2. Where technical charts alone cannot substantiate compliance, the submitting manufacturer may be required to provide a full photometric study of a specific project application for verification.

3. Lamp Data: Manufacturer, ordering code and technical information.

4. Ballast Date: Manufacturer, ordering code and technical data showing compliance with requirements.

a. Where a fixture manufacturer will utilize ballasts from multiple manufacturers depending on availability, technical data must indicate the minimum characteristics that will be met in all cases.

D. Scaled shop drawings detailing nonstandard fixtures and indicating dimensions, weights, method of field assembly, components, features, and accessories. Details shall be scaled at not less than half full size.

1. Scaled shop drawings of continuous run fixtures shall indicate overall length of each run, lamp combinations used to achieve the length, and any accessory components required.

E. Wiring diagrams detailing wiring for control system showing both factory-installed and field-installed wiring for specific system of this Project, and differentiating between factory-installed and field-installed wiring.

F. Coordination Drawings showing fixtures mounted on, in, or above ceiling. Indicate coordination with ceiling grids and other equipment installed in vicinity.

G. Product certificates signed by manufacturers of lighting fixtures certifying that their products comply with specified requirements.

H. Field test reports indicating and interpreting test results specified in Part 3 of this Section.

I. Maintenance data for fixtures to include in the operation and maintenance manual specified in Division 1.

1.06 WARRANTY

A. General Warranty: The special warranty specified in this Article shall be in addition to, and run concurrent with, other warranties made under requirements of the Contract Documents.

Special Warranty: Submit a written warranty signed by manufacturer and Installer agreeing to replace external parts of lighting fixtures exhibiting a failure of finish as specified below. This warranty is in addition to, and not a limitation of, other rights and remedies specified elsewhere within the Contract Documents.

1. Protection of Metal from Corrosion: Warranty against perforation or erosion of finish due to weathering.

2. Color Retention: Warranty against fading, staining, and chalking due to effects of weather and solar radiation.

3. Special Warranty Period: 5 years from date of Substantial Completion.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Luminaires and lighting equipment shall be delivered to the project complete, including mounting devices, lamps, and components necessary for the proper operation of the equipment.

B. Marking: All equipment must be clearly and boldly identified as to the fixture type and, where practicable, the fixture location.

1. Voltage Identification: Fixtures designed for voltages other that 110-125 volt circuits shall be clearly marked.

2. Lamp Ballast Coordination: Fixtures equipped with ballasts for operation of rapid start lamps shall be plainly marked "Use Rapid Start Lamps Only." Similarly, fixtures equipped with ballasts or other components requiring use of specific types of lamps shall be plainly marked. Markings must be clear and shall be located to be readily visible to service personnel *but invisible from normal viewing angles* when lamps are in place.

C. Timely Purchase: Luminaires, associated lamps and other allied equipment shall be ordered in a timely fashion and securely stored to be available to meet the project schedule.

1.08 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Lamps: 10 lamps for every 100 of each type and rating installed. Furnish at least one of each type.

2. Plastic Diffusers and Lenses: 1 for every 100 of each type and rating installed. Furnish at least one of each type.

3. Ballasts: 1 for every 100 of each type and rating installed. Furnish at least one of each type.

4. Globes and Guards: 1 for every 20 of each type and rating installed. Furnish at least one of each type.

5. Parabolic Louvers and Reflector Cones: 1 for every 100 of each type. Furnish at least one of each type.

6. Custom Luminaires: When 10 identical custom fixtures are furnished, furnish one complete spare custom fixture as attic stock.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with the submittal requirements of this specification, fixtures that may be incorporated into the Work include, but are not limited to, the products specified in the Lighting Fixture Schedule at end of this Section. The photometric performance of all submitted products must meet or exceed the performance of the specified fixtures where proposed.

2.02 FIXTURES AND FIXTURE COMPONENTS, GENERAL

A. Sheet Metal Components: Provide the required dimensional thickness of metal, plastic and composite materials so that all fixtures are rigid, stable and will resist deflection, twisting, warping under normal installation, and relamping procedures.

1. All luminaire housings shall be minimum 0.84 mm cold rolled steel, unless a heavier gauge is specified or required by code.

2. All aluminum extrusion housings shall be minimum 5 mm thick.

3. All spun, hydro-formed or sheet aluminum reflectors shall be fabricated from # 12 aluminum sheets minimum, 1.45 mm or heavier. Material shall be 3002 alloy, 99.5 percent pure aluminum with uniform grain structure.

4. All spun aluminum housings shall be of an alloy of the 5000 series (ANSI/ASTM-B209-1977) or of an alloy that is found to have equal corrosion resistance.

B. Joints: Provide positive, durable, means of connection at all joints as required. No hollow rivets, unless specifically approved.

C. Gaskets: Provide neoprene, silicone, rubber, or other appropriate gaskets, stops, and barriers where required to prevent light leak, control sound and vibration, prevent water leaks and, if pertinent, water vapor penetration.

D. Edges: Provide finished product with the following minimum qualities:

1. Ground and/or burr free metal edges.

2. Tight fitting connections, hinges, and closures.

3. Clean neat corners, edges, trims, and frames.

E. Castings: All cast parts, including die-cast members, shall be of uniform quality; free from blow holes, pores, hard spots, shrinkage defects, cracks, and/or other imperfections that affect strength and appearance, or are indicative of inferior metals or alloys.

F. Reflecting Surfaces: Minimum reflectance as follows, except as otherwise indicated:

1. White Surfaces: 85 percent.

2. Specular Surfaces: 83 percent.

3. Diffusing Specular Surfaces: 75 percent.

4. Laminated Silver Metallic Film: 90 percent.

G. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or water white, annealed crystal glass, except as otherwise indicated. Greenish-tinted lenses are not acceptable. Heat resistant where required: borosilicate or Pyrex glass.

1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

2. Lens Thickness: 0.125 inch (3 mm) minimum; except where greater thickness is indicated.

H. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.

I. Fixture Support Components: Comply with Division 26 Section "Common Work Results for Electrical."

1. Single-Stem Hangers: ½ inch (12 mm) steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture

2. Twin-Stem Hangers: Two, ½ inch (12 mm) steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.

3. Rod Hangers: 3/16 inch (5 mm) minimum diameter, cadmium-plated, threaded steel rod.

4. Hook Hanger: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

J. Instant Restrike Device: Solid-state, potted module, mounted inside HPS fixture and compatible with HPS lamps, ballasts, and sockets up to 150 W.

1. Restrike Range: 105 to 130 VAC.

2. Maximum Voltage: 250 V peak or 150 VAC RMS.

K. Auxiliary, Instant-On, Quartz System: Automatically switches quartz lamp when fixture is initially energized and when momentary power outages occur. Turns quartz lamp off automatically when HID lamp reaches approximately 60 percent light output.

L. Track-Lighting Systems: Provide components, including track, fittings, and fixtures from same manufacturer and as recommended by manufacturer for intended use.

1. Maintain a continuity of conductors through feeds, splices, and boxes. The relative positions of live and neutral conductors must always be maintained along a continuous run so that track fittings connect into the track in a consistent manner.

2. Install surface mounted track straight and true regardless of the ceiling contour.

M. Pole-mounted Fixtures: Provide reinforcement for all exterior pole mounted luminaires in accordance with manufacturer's recommendations. Reinforcement shall be designed to prevent overturning or permanent deflection in winds up to 160 km/hr. with a gust factor of 1.3, or in winds equal to the local maximum annual wind velocity, whichever is greater. Existing soil conditions should be taken into account. Include in submissions details of all pole reinforcements for approval by Structural Engineer.

1. Conform to AASHTO LTS-3

2. Arm, Bracket, and Tenon Mount Materials: Match pole's finish.

3. Mountings, Fastenings, and Appurtenances: Corrosion-resistant items compatible with support components. Use materials that will not cause galvanic action at contact points. Use mountings that correctly position luminaire to provide indicated light distribution.

4. Pole Shafts: As indicated.

5. Pole Bases: Anchor type with galvanized steel hold-down or anchor bolts, leveling nuts, and bolt covers.

6. Steel Poles: Conforming to ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psi (317 MPa), unless otherwise indicated. Poles are 1-piece construction up to 12 m in length.

7. Cast Iron Poles: 1-piece heavy wall construction, ASTM A 48-83 Class 30. Provide access handhole in pole base.

8. Metal Pole Grounding Provisions: Welded ½ inch (12 mm) threaded lug, accessible through handhole.

9. Metal Pole Brackets: Designed to match pole metal.

10. Pole-Top Tenons: Fabricated to support fixture or fixtures and brackets indicated and securely fastened to pole top.

11. Concrete for Pole Foundations: Comply with Division 3 Section "Cast-in Place Concrete." Use 3000 psig (20.7-MPa) strength, 28 day concrete.

N. Cast-in Fixture: Housings installed directly in concrete shall be fabricated of hot dip galvanized steel or cast aluminum. Where cast aluminum housings are used, give two coats of asphaltum paint prior to installation. To prevent direct contact of housings to

concrete, 3 mm thick x 51 mm diameter solid neoprene grommets shall be furnished at every point light fixture surfaces are mounted to concrete structure.

2.03 FINISHES

A. Manufacturer's standard, except as otherwise indicated, applied over corrosion-resistant treatment or primer, free of streaks, runs, holidays, stains, blisters, and similar defects.

1. Prior to finishing, all surfaces must be free from foreign materials such as dirt, rust, oil, polishing compounds, and mold release agents.

2. Where necessary, surface cleaned by accepted chemical means shall receive corrosion inhibiting phosphating treatment assuring positive paint adhesion.

3. All castings and extrusions shall be machined, sanded or similarly treated, and given minimum one coat of baked-on clear methacrylate lacquer, unless a painted finish is specified.

4. Aluminum surfaces exposed to weather (other that anodized reflectors covered elsewhere) receive a duronodic or polyester powder paint finish as specified for corrosion resistance.

5. Sheet steel fixture housings, iron and steel parts, which have not received phosphating treatment ("Bonderizing" or similar process) or are to be utilized in exterior applications, are to be made corrosion resistant by zinc or cadmium plating or hot-dip galvanizing.

6. Anodized aluminum reflectors required for exterior use shall have a minimum of 0.02 mm anodizing thickness.

2.04 LAMPS

A. Available Products: Lamps of the same type (such as fluorescent or HID) shall be supplied from the same manufacturer. Where a specific lamp manufacturer has been indicated in the Luminaire Schedule within this Section, lamps shall be supplied from the named manufacturer only. Provide fluorescent lamps from Osram Sylvania or Philips Lighting only.

B. Fluorescent Color Temperature and Minimum Color-Rendering Index (CRI): 3000 K and 85 CRI, except as otherwise indicated.

C. Non-compact Fluorescent Lamp Life: Rated average is 20,000 hours at 3 hours per start when used on rapid start circuits.

D. Metal Halide Color Temperature and Minimum Color-Rendering Index (CRI): 3600 K and 70 CRI, except as otherwise indicated. Environmentally Responsible Lamp Technology: Use only fluorescent and metal halide sources that are low mercury and TCLP-compliant, except where not available in a specified lamp type.

E. Environmentally Responsible Lamp Technology: Use only fluorescent and metal halide sources that are low mercury and TCLP-compliant, except where not available in a specified lamp type.

F. Lamp Burn-in Period: Fluorescent and metal halide lamps that are specified for dimming shall be burned-in, or run continuously in a non-dim state, for a period of 100 hours prior to dimming the lamps.

2.05 LAMPHOLDERS

A. Screw Base: Screw base sockets for incandescent and metallic vapor lamps shall be of heavy duty heat resistant porcelain with spring center contacts and plated screw shells. For ceramic metal halide lamps with electronic ballasts, provide minimum 4 KV pulse rated lampholders.

B. Fluorescent Sockets: Fluorescent lamp sockets operating with an open circuit voltage in excess of 300 volts shall be of the safety type, that open the supply circuit when the lamp is removed from the sockets.

2.06 BALLASTS

A. Fluorescent Ballasts: Electronic integrated circuit, solid-state, full-light-output, energy-efficient rapid start type, unless otherwise indicated; must be compatible with lamps and lamp combinations to which connected.

1. Underwriters Laboratories (UL) listed, Class P, Type 1.

2. Certification by Certified Ballast Manufacturers Association (CBM).

3. Ballast shall be rapid start, unless otherwise indicated. Ballast starting parameters shall be consistent with lamp manufacturer's recommendations and shall provide full rated lamp life under normal operating conditions.

4. Ballast shall have audible noise rating of Class "A" except as otherwise indicated.

5. Voltage: Match connected circuits.

6. Lamp Flicker: Less than 5 percent.

7. Minimum Power Factor: 95 percent.

8. Total Harmonic Distortion (THD) of Ballast Current: 20 percent or less.

9. Minimum Ballast Factor (relative light output): 88 percent for T8 lamps, 87 percent for T5 compact fluorescent, 97 percent for all T4 compact fluorescent, and 100 percent for linear T5.

10. Multi-Lamp Ballasts: Use 2 lamp ballasts for multi-lamp fixtures where possible. Supply 3 or 4 lamp ballasts only if the ballasts comply with the other requirements of this specification.

11. Lamp-ballast connection method shall not reduce normal rated life of lamps.

12. Ballast shall comply with all applicable local, state, and federal efficiency standards.

13. For lamps smaller than one inch in diameter (all T2, T4 and T5 lamps) ballasts shall be equipped with a cut-off circuit that senses an over-voltage condition to the lamp for end-of-life protection.

14. Low-Temperature Fluorescent Ballasts: Comply with above requirements, except ballast may be Class P electromagnetic type. Starting temperature shall be minus 20 deg. F or colder, or the minimum available depending on lamp type.

15. Dimming Ballasts: Electronic rapid start type providing smooth dimming over a minimum range from 100 to 1 percent light output (unless otherwise specified). Listed for use with specific fluorescent dimming system provided.

16. Remote Ballasts: Where ballasts must be mounted remotely from fixtures, provide locations that fall within the manufacturer's recommended distance limitations.

B. HID Ballasts: Include the following features, except as otherwise indicated.

1. Constant wattage auto-transformer (CWA) or regulating high-power-factor type, unless otherwise indicated.

2. Conform to UL 1029 and ANSI C82.4.

3. Operating Voltage: Match system voltage.

4. Single-Lamp Ballasts: Minimum starting temperature of minus 30 deg F.

5. Normal Ambient Operating Temperature: 40 deg F.

6. Open circuit operation will not reduce average life.

7. High-Pressure Sodium (HPS) Ballasts: Equip with a solid-state igniter/starter having an average life in pulsing mode of 10,000 hours at an igniter/starter case temperature of 90 deg F.

8. Encapsulation: Manufacturer's standard epoxy-encapsulated model designed to minimize audible fixture noise.

9. Electronic HID Ballasts: Provide electronic ballasts for ceramic metal halide lamps that include the following features:

a. Integrated electronic ballast, igniter and capacitor.

b. Operating Voltage: Match system voltage, or universal voltage.

c. Minimum Power Factor: 95 percent.

d. Total Harmonic Distortion (THD) of Ballast Current: 15 percent or less.

e. Sound Rating: Class "A".

f. Lamp Current Crest Factor: Less than 1.3.

g. Ballast shall be equipped with a "Turn Off" safety function to prevent excessive ballast pulsing under conditions of: failed lamp, no lamp, or other sustained abnormal conditions such as rectification or glow mode.

h. Ballast shall have not more than +/- 0.5 percent variation in output power with a +/- 10 percent in input line voltage.

i. The lamp manufacturer shall approve or warrant the specified lamps for use on the designated Electronic Metal Halide ballast.

j. Safety: Ballast shall comply with FCC Part 18C for non-consumer limits for EMI and RFI. Ballast shall be UL listed.

k. Approved Manufacturer: Aromat Corporation.

2.07 TRANSFORMERS

A. Suitability: Transformers shall be of the best quality and sized to compensate for voltage drop over indicated distances and meet with the following requirements:

1. Where possible transformers have an integral line voltage switch.

2. All transformers shall be locally fused.

3. Provide adequate ventilation to meet code and manufacturers' requirements concerning temperature rise.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's written instructions and approved Shop Drawings. Support fixtures according to requirements of Division 16 Section "Basic Electrical Materials and Methods".

B. Support for Recessed and Semi-recessed Grid-Type Fluorescent Fixtures: Units may be supported from suspended ceiling support system, unless prohibited by local codes. No movement permitted after installation. Install ceiling support system rods or wires at a minimum of 4 rods or wired for each fixture, located not more than 6 inches (150 mm) from fixture corners.

1. Install support clips for recessed fixtures, securely fastened to ceiling grid members, at or near each fixture corner.

2. Fixtures Smaller than Ceiling Grid: For fixtures that normally mount at the ceiling grid on at least one side, install a minimum of 4 rods or wires for each fixture and locate at corner of ceiling grid where fixture is located. Provide additional ceiling grid to frame out fixture. Do not support fixtures by ceiling acoustical panels.

3. Fixtures of Sizes Less than Ceiling Grid: Center in acoustical panel. Support fixtures independently with at least two ¾ inch (20 mm) metal channels spanning and secured to ceiling tees.

C. Support for Suspended Fixtures: Brace pendants and rods over 48 inches (1200 mm) long to limit swinging. Support stem-mounted, single-unit, suspended fluorescent fixtures with twin-stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod or cable for suspension for each unit length of chassis, including one at each end.

1. Provide all mounting components required for installation, including hickeys, stud-extensions, ball-aligners, canopies and stems.

2. Provide stems on pendant fixtures of the correct length to uniformly maintain the fixture heights shown on the drawings or established in the field.

D. Air Handling Fixtures: Install with dampers closed.

E. Cast-in Fixtures: Housings installed directly in concrete shall be fabricated of hot dip galvanized steel or cast aluminum. Where cast aluminum housings are used, give two coats of asphaltum paint prior to installation. To prevent direct contact of housings to concrete, 3 mm thick x 51 mm diameter solid neoprene grommets shall be furnished at every point light fixture surfaces are mounted to concrete structure.

F. Concrete Foundations: Construct according to Division 3 Section "Cast-in-Place Concrete".

1. Comply with details and manufacturer's recommendations for reinforcing, anchor bolts, nuts, and washers. Verify anchor-bolt templates by comparing with actual pole bases furnished.

2. Finish: Trowel and rub smooth parts exposed to view.

G. Pole Installation: Use web fabric slings (not chain or cable) to raise and set poles.

H. Fixture Attachment: Fasten to indicated structural supports.

I. Fixture Attachment with Adjustable Features or Aiming: Attach fixtures and supports to allow aiming for indicated light distribution.

J. Lamping: Where specific lamp designations are not indicated, lamp units according to manufacturer's instructions.

K. Installation Sequence: Install fixture mounting frames, plaster rings, etc. prior to the trim assembly, which shall not be installed until the project is "broom-clean." Where the fixture location or construction does not permit sequential installation, all reflectors, lenses, flanges, and other visible surfaces shall be carefully protected.

3.02 WIRING

A. Minimum Standards: All wiring shall comply with the following standards:

1. All wiring within lighting fixtures or from the splice with the building wiring shall be as specified under "WIRE AND CABLES."

2. Wiring between fluorescent lamp holders and associated operating and starting equipment shall be of similar or heavier gauge than the leads furnished with the approved ballasts.

3. Wire leads to the receptacle or connector of any side prong incandescent lamp or any "cool-beam" lamp, or any lamp 200 watts or over shall be SF-2 (silicone rubber insulated) stranded wire.

4. Wiring within fixture construction is to be concealed, except where the fixture design or mounting dictates otherwise.

5. Joints in wiring within lighting fixtures and connections of the fixture wiring to the wiring of the building shall be as specified under "WIRE AND CABLES" with special attention to paragraphs relating to high amperage, low voltage conditions.

6. Wiring channels and wireways shall be free from projections and rough or sharp edges throughout, and at all points or edges over which conductors must pass and may be subject to injury or wear.

7. Insulated bushings shall be installed at points of entrance and exit of flexible wiring.

3.03 GROUNDING

A. Ground fixtures and metal poles according to Division 26 Section "Grounding and Bonding for Electrical Systems." Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values.

1. Poles: Install 3-m driven ground rod at each pole.

2. Nonmetallic Poles: Ground metallic components of lighting unit and foundations. Connect fixtures to grounding system with No. 6 AWG conductor.

3.04 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Give advance notice of dates and times for field tests.

C. Provide instruments to make and record test results.

D. Tests: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source.

E. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.

F. Report results of tests.

G. Replace fixtures that show evidence of corrosion during Project warranty period.

3.05 CLEANING AND ADJUSTING

A. Clean Fixtures After Installation: Remove all protective strippable coatings, dust, finger marks, paint spots, and any materials deleterious to the appearance or functioning of the fixtures. Use methods and materials recommended by manufacturer. Abrasive cleaners are not permitted.

B. Focusing and Adjustment: After installation of all lighting fixtures, finishes and furnishings has been completed, provide personnel, ladders or lifts, spare lamps, and any other equipment necessary to expeditiously focus all lighting. Focusing shall be performed *after dark*, unless all visible daylight can be screened out of the focusing area, and shall take place under supervision of the Lighting Designer. All work shall be performed in accordance with union rules, should they be in force, and applicable codes. Where pre-aiming diagrams or angles have been provided by the Lighting Designer, this information shall be considered preliminary aiming, which is being provided to help expedite the process of night focusing. Pre-aiming by the Contractor does not eliminate the requirement for final focusing after dark.

1. Aim all adjustable lighting fixtures according to instructions.

2. Program preset dimming system "scene" lighting levels, where applicable.

3.06 FINAL INSPECTION

A. Upon completion of the installation, lighting equipment must be in first class operating order and free from defects in condition or finish.

1. At time of final inspection, all fixtures and equipment must be installed and lamped with *new* lamps and be complete with all lenses, diffusers, reflectors, side panels, louvers, or other necessary components. Lamps that have been operating longer than the following time limits or that have already burned out must be replaced with new lamps prior to final completion.

   A. Halogen Incandescent lamps: 200 hours (approximately 25 eight-hour days).

   B. Non-halogen Incandescent lamps: 75 hours (approximately 9 eight-hour days).

   C. Fluorescent lamps: 1000 hours (approximately 125 eight-hour days).

   D. HID lamps: 1000 hours (approximately 125 eight-hour days).

2. Fixtures shall be completely clean and free from finger marks, dust, plaster, or paint spots.

3. Any reflectors, lenses, diffusers, side panels, or other parts damaged prior to the final inspection shall be replaced.

4. Exterior poles, bollards, bases, and other exterior fixtures shall be painted to match factory color where finish has been scratched or damaged.

5. Housings shall be rigidly installed and adjusted to a neat flush fit with the ceiling.

6. *No light leaks* shall be permitted at the ceiling line or from any visible part or joint.

Section continues on next page.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L1	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle, mounted 10' AFF, 4' length Location(s): Perimeter adoption and holding areas	(3) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 104W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-4FT-R4-120-GEB10-DCT-L/LP-F2/84-C110-NYC Or approved equal.

Type L1 Series Notes: Provide two circuits – two outer lamps on/off switching, center lamp hi/low switching, provide program start electronic ballasts for on/off switched lamps and electronic hi-low switching ballasts for center lamp; provide timeclock control with the ability for at least four trigger points to accommodate control intent; provide white parabolic baffle; provide mounting for exposed concrete slab ceiling with 84" mounting cables; Architect/Contractor to verify, fixture to be mounted 10'-0" AFF; provide compatible emergency battery pack ballasts with a minimum 1050 lumen output for 32W T8 (such as Bodine B50LP); Electrical Engineer/Contractor to specify wiring for emergency battery pack ballasts, including options for code compliance, see manufacturer's wiring guide and emergency lighting layout for more information; only center lamp per 3' or 4' length of "-EM" fixture is to be wired to an emergency battery pack ballast; for all Type L1 series fixtures, manufacturer's shop drawings showing full run lengths are required for approval; individual section lengths are to be symmetrical about the center of each full run length; Architect to verify painted aluminum finish; Type L1 series used for interior and exterior egress lighting

L1-EM	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle and 1-lamp emergency battery pack ballast, mounted 10' AFF, 4' length Location(s): Perimeter adoption and holding areas	(3) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 104W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-4FT-R4-120-GEB10-1SE-EL-DCT-L/LP-F2/84-C110-NYC Or approved equal. Emergency layout: one-lamp emergency battery pack ballast shall be wired to the center lamp of the 4' run

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L1A-EM	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle and two 1-lamp emergency battery pack ballasts, mounted 10' AFF, 12' length Location(s): Perimeter adoption and holding areas	(9) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 280W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-12FT-R12-120-GEB10 2SE-EL-DCT-L/LP-F2/84-C110-NYC Or approved equal. Emergency layout: one-lamp emergency battery pack ballast shall be wired to the center lamp at each end of the overall 12' run
L1B-EM	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle and two 1-lamp emergency battery pack ballasts, mounted 10' AFF, 16' length Location(s): Lobby/Feline Adoption	(12) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 370W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-16FT-R8-120-GEB10 2SE-EL-DCT-L/LP-F2/84-C110-NYC Or approved equal. Emergency layout: one-lamp emergency battery pack ballast shall be wired to the center lamp of every other 4' length of the overall 16' run, beginning with the end over the reception desk
L1C-EM1	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle and seven 1-lamp emergency battery pack ballasts, mounted 10' AFF, 26' length Location(s): Feline Holding/Quarantine	(15) FO32/830/XPS/ ECO + (6) FO25/830/XPS/ ECO Osram Sylvania Input Watts: 633W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-26FT-R8-120-GEB10 7SE-EL-DCT-L/LP-F2/84-C110-NYC For 26' run, provide 8', 4' and 3' sections. Or approved equal. Emergency layout: one-lamp emergency battery pack ballast shall be wired to every center lamp in the overall 26' run

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L1C-EM2	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle and four 1-lamp emergency battery pack ballasts, mounted 10' AFF, 26' length Location(s): Canine Holding	(15) FO32/830/XPS/ ECO + (6) FO25/830/XPS/ ECO Osram Sylvania Input Watts: 633W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-26FT-R8-120-GEB10-4SE-EL-DCT-L/LP-F2/84-C110-NYC For 26' run, provide 8', 4' and 3' sections. Or approved equal. Emergency layout: one-lamp emergency battery pack ballast shall be wired to every other center lamp in the overall 26' run
L1D	Not used		
L1E	Cable mounted T8 linear fluorescent 3-lamp cross section indirect pendant with white parabolic baffle, mounted 10' AFF, 4' length Location(s): Canine Adoption	(3) FO32/830/XPS/ ECO Input Watts: 104W	PEERLESS LIGHTING BRM4-3-32- MOD/100/0-SPR-WPB-4FT-R4-120-GEB10-DCT-L/LP-F2/84-C110-NYC Modify for 100% uplight optics. Or approved equal.
L1F	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle, mounted 10' AFF, 8' length Location(s): Intake Area	(6) FO32/830/XPS/ ECO Input Watts: 185W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-8FT-R8-120-GEB10-DCT-L/LP-F2/84-C110-NYC Or approved equal.
L1G	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle, mounted 10' AFF, 19' length Location(s): Storage/Freezer, above Janitor's Closet & Food Preparation ceilings	(12) FO32/830/XPS/ ECO + (3) FO25/830/XPS/ ECO Osram Sylvania Input Watts: 453W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-19FT-R8-120-GEB10-DCT-L/LP-F2/84-C110-NYC For 19' run, provide 8' and 3' sections. Or approved equal.

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L1H-EM	Cable mounted T8 linear fluorescent 3-lamp cross section direct/indirect pendant with white parabolic baffle and seven 1-lamp emergency battery pack ballasts, mounted 10' AFF, 50' length Location(s): Intake Area	(33) FO32/830/XPS/ ECO + (6) FO25/830/XPS/ ECO Osram Sylvania Input Watts: 1192W	PEERLESS LIGHTING BRM4-3-32-20/80-SPR-WPB-50FT-R12-120-GEB10-7SE-EL-DCT-L/LP-F2/84-C110-NYC For 50' run, provide 12', 8' and 3' sections. Or approved equal. Emergency layout: one-lamp emergency battery pack ballast shall be wired to every other center lamp in the overall 50' run
L2	Cable mounted T8 linear fluorescent 1-lamp cross section direct/indirect pendant with white parabolic baffle, mounted 10' AFF, 4' length Location(s): Corridors	(1) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 34W	PEERLESS LIGHTING BRM4-1-32-20/80-SPR-WPB-4FT-R4-120-GEB10-SCT-L/LP-F2/16-C110-NYC Or approved equal. Provide program start electronic ballast and white parabolic baffle; provide mounting for exposed concrete slab ceiling with 16" mounting cables; Architect/Contractor to verify, fixture to be mounted 10'-0" AFF; Architect to verify painted aluminum finish

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L2-EM	Cable mounted T8 linear fluorescent 1-lamp cross section direct/indirect pendant with white parabolic baffle and 1-lamp emergency battery pack ballast mounted 10' AFF, 4' length Location(s): Corridors	(1) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 34W	PEERLESS LIGHTING BRM4-1-32-20/80-SPR-WPB-4FT-R4-120-GEB10-1SE-EL-SCT-L/LP-F2/16-C110-NYC Or approved equal. Provide program start electronic ballast and white parabolic baffle; provide mounting for exposed concrete slab ceiling with 16" mounting cables; Architect/Contractor to verify, fixture to be mounted 10'-0" AFF; Architect to verify painted aluminum finish; provide compatible emergency battery pack with a minimum 1050 lumen output for 32W T8 (such as Bodine B50LP); Electrical Engineer/Contractor to specify wiring for emergency battery packs, see emergency lighting layout for additional information
L3	Cable mounted T8 linear fluorescent 2-lamp cross section direct/indirect pendant with white perforated baffle, mounted 10' AFF, 4' length Location(s): Interior exam areas and offices	(2) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 68W	FINELITE S4-4'-2T8-SC-91W-120-AC 12" Provide 12" semi-adjustable aircraft cable mounting; provide program start electronic ballast; Architect/Contractor to verify, fixture to be mounted 10'-0" AFF. Or approved equal.

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L3-EM	Cable mounted T8 linear fluorescent 2-lamp cross section direct/indirect pendant with white perforated baffle, mounted 10' AFF, 4' length Location(s): Interior exam areas and offices	(2) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 68W	FINELITE S4-4'-2T8-SC-91W-120-AC 12"-Emergency Battery Provide 12" semi-adjustable aircraft cable mounting and program start electronic ballast; provide compatible emergency battery pack with a minimum 1100 lumen output (such as Bodine LP600); Architect/Contractor to verify, fixture to be mounted 10'-0" AFF Or approved equal.
L3A	Cable mounted T8 linear fluorescent 2-lamp cross section direct/indirect pendant with white perforated baffle, mounted 10' AFF, 8' length Location(s): Interior exam areas and offices	(4) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 115W	FINELITE S4-8'-2T8-SC-91W-120-AC 12" Provide 12" semi-adjustable aircraft cable mounting; Architect/Contractor to verify, fixture to be mounted 10'-0" AFF; provide program start electronic ballast. Or approved equal.
L4	Cable mounted T8 linear fluorescent 4-lamp cross section direct/indirect pendant with white perforated baffle, mounted 10' AFF, 4' length Location(s): Feline Recovery	(4) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 115W	FINELITE S4-4'-4T8-SC-91W-120-AC 12" Provide 12" semi-adjustable aircraft cable mounting; Architect/Contractor to verify, fixture to be mounted 10'-0" AFF; provide program start electronic ballast. Or approved equal.

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L4A	Cable mounted T8 linear fluorescent 4-lamp cross section direct/indirect pendant with white perforated baffle, mounted 10' AFF, 8' length Location(s): Canine Recovery	(8) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 230W	FINELITE S4-8'-4T8-SC-91W-120-AC 12" Provide 12" semi-adjustable aircraft cable mounting; Architect/Contractor to verify, fixture to be mounted 10'-0" AFF; provide program start electronic ballast. Or approved equal.
L5	Cable mounted T8 linear fluorescent 2-lamp cross section lensed sealed area light, mounted 10' AFF, 4' length Location(s): Surgery, Surgery Prep Room	(2) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 63W	LUMINAIRE LIGHTING VPF84-232-ELECT-120-OP-BK-Pendant-PT With opal lens; Architect to verify black finish; provide cable mounting; Architect/Contractor to verify, fixture to be mounted 10'-0" AFF. Or approved equal.
L5-EM	Cable mounted T8 linear fluorescent 2-lamp cross section lensed sealed area light, mounted 10' AFF, 4' length Location(s): Surgery, Surgery Prep Room	(2) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 63W	LUMINAIRE LIGHTING VPF84-232-ELECT-120-OP-BK-Pendant-EMB50--PT With opal lens; Architect to verify black finish; provide cable mounting; provide compatible emergency battery pack with a minimum 1050 lumen output for 32W T8 (such as Bodine B50LP); Architect/Contractor to verify, fixture to be mounted 10'-0" AFF. Or approved equal.

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L6	Surface mounted T8 linear fluorescent lensed vanity light Location(s): Restrooms	(1) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 36W	OXYGEN LIGHTING 2-587-24-120 Architect to verify stain nickel finish; supply with program start electronic ballast. Or approved equal.
L7	Recessed exterior rated LED 4.5" aperture shallow downlight, 5.5" recessing depth Location(s): Cattery, exterior canopy, **Lobby**	2700K Warm White LED Input Watts: 10.5W	CREE H4 LR4E-15 LT4-15WH Maximum recessing depth 6" to face of finished ceiling; Architect to verify white painted flange finish. Or approved equal.
L7-EM	Recessed exterior rated LED 4.5" aperture shallow downlight wired to emergency inverter, 5.5" recessing depth Location(s): Cattery, Lobby	2700K Warm White LED Input Watts: 10.5W	CREE H4 LR4E-15 LT4-15WH Maximum recessing depth 6" to face of finished ceiling; Architect to verify white painted flange finish; fixtures are to be wired to a central emergency inverter with at least 100W output (such as Dual-Lite LG1 series) to accommodate entire circuit. Or approved equal.
L8	Standalone LED adjustable desk lamp Location(s): Offices	3500K Warm White LEDs Input Watts: 6.8W	FINELITE Lamp: DL-6W-B Base: WB-5-B Occupancy Sensor: DIF-110 Provide weighted base and occupancy sensor; provide power supply and all cables to comprise a complete system; Architect to verify black finish for all components. Or approved equal.

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L9	Surface mounted T8 linear fluorescent lensed undercabinet light, 4' length Location(s): Food Preparation, Lunch Room	(1) FO32/830/XPS/ ECO Osram Sylvania Input Watts: 36W	ALKCO SF332/RSW-1266. Or approved equal. Provide rocker switch.
LX1	Exterior pole mounted full cut off metal halide flood light with Type III distribution on a 14'-0" pole Location(s): Parking Lot	MHC100/U/M/3K/ ALTO Philips Input Watts: 110W	KIM LIGHTING Fxture: 1A/WP9SE3/ 100PMH120/BL/HSF Pole: PRA14-4125/SA/BL Provide horizontal slipfitter to replace standard mounting arm; Contractor to provide 2'-0"davit arm with 2" pipe-size and matching finish (not supplied by Kim Lighting); Architect to verify black finish for fixture, pole and davit arm; Contractor to coordinate fixture mounting in ground. Or approved equal.
LX1A	Exterior pole mounted full cut off metal halide flood light with Type III distribution and house side shield on a 14'-0" pole Location(s): Parking Lot	MHC100/U/M/3K/ ALTO Philips Input Watts: 110W	KIM LIGHTING Fixture: 1A/WP9SE3/ 100PMH120/BL/HS/HSF Pole: PRA14-4125/SA/BL Provide house side shield; provide horizontal slipfitter to replace standard mounting arm; Contractor to provide 2'-0"davit arm with 2" pipe-size and matching finish (not supplied by Kim Lighting); Architect to verify black finish for fixture, pole and davit arm; Contractor to coordinate fixture mounting in ground. Or approved equal.

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
LX2	Exterior wall mounted compact fluorescent area light Location(s): Above exterior doors	FT24DL/830/ ECO Osram Sylvania Input Watts: 27W	BEGA 2295P-BLK-120 Architect to verify black finish. Or approved equal.
LX3	Exterior wet location LED bollard Location(s): Exterior Pathways	4000K Warm White LEDs Input Watts: 10W	LUMENTON LIGHTING BL1D400/C00034-Black Architect to verify black finish. Or approved equal.

END OF SECTION 265000

Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

LUMINAIRE SCHEDULE – BASIS OF DESIGN

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG

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Notes:
1. Contractor shall verify all catalog codes with drawn and written descriptions.
2. Architect to verify all fixture finishes.
3. Contractor to coordinate all ceiling materials and thicknesses with fixture trim requirements. Thick ceilings (greater than ¾") may require modifications to fixtures.
4. Electrical Engineer to verify all supply voltages.

SECTION 280800

COMMISSIONING OF ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

B. The OPR and BOD documentation are included by reference for information only.

C. Division 01 section 'LEED Requirements' for additional LEED requirements.

1.2 SUMMARY

A. This section includes commissioning process requirements for Electronic systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DESCRIPTION

A. Refer to Division 01 Section "General Commissioning Requirements" for the description of commissioning.

1.4 DEFINITIONS

A. Refer to Division 01 Section "General Commissioning Requirements" for definitions.

1.5 SUBMITTALS

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's role.

B. Refer to Division 01 Section "Submittals" for specific requirements. In addition, provide the following:

C. Certificates of readiness

D. Certificates of completion of installation, prestart, and startup activities.

E. O&M manuals

F. Test reports

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the contractor of Division 28 shall ultimately be responsible for all standard testing equipment for the electronic systems in Division 28. A sufficient quantity of two-way radios shall be provided by each contractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the City of New York and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York upon completion of the commissioning process.

D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the City of New York.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the installing contractors, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems

B. **Red-lined Drawings:** The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. **Operation and Maintenance Data:** Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.

D. **Demonstration and Training:** Contractor will provide demonstration and training as required by the specifications. A complete training plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any training. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.

B. Attend construction phase controls coordination meetings.

C. Participate in Electronic systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CA.

D. Provide information requested by the CxA for final commissioning documentation.

E. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.

F. Prepare preliminary schedule for Electronic system orientations and inspections, operation and maintenance manual submissions, training sessions, equipment start-up and task completion for Commissioner. Distribute preliminary schedule to commissioning team members.

G. Update schedule as required throughout the construction period.

H. Assist the CxA in all verification and functional performance tests.

I. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

J. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.

K. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

L. Notify the CxA a minimum of two weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.

M. Participate in, and schedule vendors and contractors to participate in the training sessions.
1. Provide written notification to the CM/GC and CxA that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.
2. Fire alarm system.
3. CCTV system.
4. Security system.
5. Access control system.

N. The equipment supplier shall document the performance of his equipment.

O. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

P. Equipment Suppliers
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Commissioner, to keep warranties in force.
2. Assist in equipment testing per agreements with contractors.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

Q. Refer to Division 01 Section "General Commissioning Requirements" for additional Contractor responsibilities.

3.3 COMMISSIONER'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Commissioner's Responsibilities.

3.4 DESIGN PROFESSIONAL'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for Design Professional's Responsibilities.

3.5 CxA'S RESPONSIBILITIES

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's Responsibilities.

3.6 TESTING PREPARATION

A. Certify in writing to the CxA that Electronic systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that Electronic instrumentation and controls have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that testing procedures have been completed and that testing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with building automation, smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.7 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of Electronic testing shall include the entire Electronic system installation, from the incoming power equipment throughout to each peripheral and end device. Testing shall include measuring, but not limited to resistance, voltage, and amperage of system(s) and devices.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Electronic system contractor and other contracted subcontractors, including the fire alarm Subcontractor shall prepare detailed testing plans, procedures, and checklists for Electronic systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the Electronic system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.8 ELECTRICAL SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. **Equipment Testing and Acceptance Procedures:** Testing requirements are specified in individual Division 28 sections. Provide submittals, test data, inspector record, infrared camera or special equipment and certifications to the CA.

B. **Electronic Instrumentation and Control System Testing:** Field testing plans and testing requirements are specified in Division 28 Sections "Instrumentation and Control" and "Sequence of Operations"; Assist the CxA with preparation of testing plans.

C. **Electronic System Testing (Access Control, CCTV and/or Security):** Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

D. **Fire Detection and Alarm System Testing:** Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:

1. Coordination and functionality with the Building Automation System/Building Management Controls System
2. Access Control
3. Fire Alarm System
4. Security System

3.9 DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.

3.10 APPROVAL

A. Refer to Division 01 Section "General Commissioning Requirements" for approval procedures.

3.11 DEFERRED TESTING

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to deferred testing.

3.12 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.

B. Refer to Division 01 Section "General Commissioning Requirements" for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.13 TRAINING OF CITY OF NEW YORK PERSONNEL

A. Refer to Division 01 Section "General Commissioning Requirements" for requirements pertaining to training.

END OF SECTION 280800

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SECTION 28 3100

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS AND DESCRIPTION

A. The requirements of the Contract Documents, including the General and Supplementary General Condition and Division 1 - General Requirements shall apply to the work of this section.

B. The entire system shall be installed with aesthetics in mind. All control panels and remote annunciators installed in public spaces shall be semi-flush mounted with no exposed conduit or cable trays. All cabinet edges shall be neatly trimmed.

C. This specification is designed to meet the 2008 NYC building code requirements for an A-1 Assembly occupancy less than 300 people.

1.2 SECTION INCLUDES

A. The work covered by this Section of the Specification shall include all labor, equipment, materials and services to furnish and install a complete fire alarm system of the automatic, addressable, non-coded type. It shall be complete with all necessary hardware, software and memory specifically tailored for this installation. It shall be possible to permanently modify the software on site by using a plug-in programmer. The system shall consist of, but not be limited to, the following:

1. Fire Alarm Control Panel and related remote data gathering panels.
2. Remote Annunciators with semi flush backbox.
3. Addressable analog area smoke detectors.
4. Addressable analog duct smoke detectors.
5. Addressable analog heat detectors.
6. Magnetic door\card access release override control.
7. Central station alarm connection control.
8. Air handling systems shutdown control.
9. Magnetic door holder release.
10. Sprinkler supervisory switches and tamper switch supervision.
11. Battery standby.

1.3 APPLICABLE CODES AND STANDARDS

A. All equipment shall be UL listed for its intended use and conform to the latest UL Standards.

B. Underwriters Laboratories Inc.: The system and all components shall be listed by Underwriters Laboratories Inc. for use in fire protective signaling system under the following standards as applicable:

UL 864/UOJZ, APOU Control Units for Fire Protective Signaling Systems.
UL 268 Smoke Detectors for Fire Protective Signaling Systems.
UL 268A Smoke Detectors for Duct Applications.
UL 217 Smoke Detectors Single Station.
UL 521 Heat Detectors for Fire Protective Signaling Systems.
UL 228 Door Holders for Fire Protective Signaling Systems.
UL 464 Audible Signaling Appliances.

UL 1638 Visual Signaling Appliances.
UL 38 Manually Activated Signaling Boxes.
UL 346 Waterflow Indicators for Fire Protective Signaling Systems.
UL 1971 Standard for Signaling Devices for the Hearing Impaired
UL 1481 Power Supplies for Fire Protective Signaling Systems.
UL 1711 Amplifiers for Fire Protective Signaling Systems.
UUKL The Fire Alarm system shall be UUKL for Smoke Control.

C. This installation shall comply with:
1. Americans with Disabilities Act (ADA)
2. National Electric Code, Article 760 with NYC Amendments.
3. National Fire Protection Association Standards: NFPA72
4. Local and State Building Codes and the Local Authorities Having Jurisdiction.
5. International Standards Organization (ISO): ISO-9001
6. The latest provisions of and amendments to Local Law No. 5, Local Law No. 16 and Local Law No. 58 of the City of New York.
7. All power and wire requirements shall follow the NYC Electrical Code Chapter 4000 (RS17-3 and RS17-3A).
8. 2008 NYC Building Code 2007 (Chapter 9, Chapter 30, Mechanical Code, Appendix K & Q) and other sections as they apply.
9. Utilize MEA/BSA/OTCR Approved Fire Alarm Equipment
10. The requirements of the City of New York Building Department and the City of New York Fire Department.

1.4 RELATED DOCUMENTS

A. Secure permits and approvals prior to installation.

B. Prior to commencement and after completion of work notify Authorities Having Jurisdiction.

C. Submit letter of approval for installation before requesting acceptance of system.

1.5 RELATED WORK AND SECTIONS

A. The Contractor shall coordinate work in this Section with all related trades. Work and/or equipment provided in other Sections and related to the fire alarm system shall include, but not be limited to:

1. Sprinkler waterflow and supervisory switches shall be furnished and installed by the fire protection contractor, but wired and connected by the electrical contractor. Modification of existing sprinkler devices to accommodate monitoring by the new fire alarm system shall be the responsibility of the fire alarm system installing contractor.

2. Duct smoke detectors shall be furnished, wired and connected by the electrical contractor. The HVAC contractor shall furnish necessary duct opening to install the duct smoke detectors.

3. New air handling and smoke exhaust system fan control circuits and status contacts to be furnished by the HVAC control equipment.

4. Elevator recall control circuits to be provided by the elevator control equipment. Modifications to the existing elevator controls to accommodate ANSI A17.1 shunt trip activation shall be provided by the elevator controls contractor. Any shunt trip circuit breakers and related wiring required for ANSI A17.1 compliance shall be provided by the electrical contractor (see power riser for more details).

5. Dry pipe/deluge sprinkler system release valve control circuits and supervision contacts shall be provided by the dry pipe/deluge sprinkler system control equipment.

5. Kitchen hood extinguishing systems status monitoring.

6. Fire pumps (manual, automatic and special service) status monitoring.

   a. Pump failure (fail to start) indication
   b. Pump running indication
   c. Phase reversal indication

7. Emergency generator status monitoring

   a. Running indication
   b. Fail to start indication

8. Gravity tank water level and fill pump status monitoring

   a. Water Level High Indication
   b. Water Level Low Indication
   c. Fill Pump Running Indication

9. SECTION 26 0519 - POWER CONDUCTORS, CABLES, AND CONDUIT BODIES

10. SECTION 26 0526 – GROUNDING AND BONDING FOR ELECTRIDCAL SYSTEMS

11. Installing dedicated outgoing RJ-31X telephone lines (2) shall be the responsibility of the Installing Electrical Contractor. Establishment of central station monitoring account shall be the responsibility of the fire alarm equipment vendor.

1.6 SUBMITTALS

A. Provide list of all types of equipment and components provided. This shall be incorporated as part of a Table of Contents, which will also indicate the manufacturer's part number, the description of the part, and the part number of the manufacturer's product datasheet on which the information can be found.

B. Provide description of operation of the system (Sequence of Operation), similar to that provided in Part 2 of this Section of the Specifications, to include any and all exceptions, variances or substitutions listed at the time of bid. Any such exceptions, variances or substitutions which were not listed at the time of bid and are identified in the submittal, shall be grounds for

immediate disapproval without comment. The sequence of operation shall be project specific, and shall provide individual sequences for every type of alarm, supervisory, or trouble condition, which may occur as part of normal or off-normal system use.

C. Provide manufacturer's ORIGINAL printed product data, catalog cuts and description of any special installation procedures. Photocopied and/or illegible product data sheets shall not be acceptable. All product datasheets shall be highlighted or stamped with arrows to indicate the specific components being submitted for approval.

D. Provide manufacturer's installation instruction manual for specified system.

E. Provide samples of various items when requested.

F. Provide copy of State License to perform such work.

G. Provide copies of NICET Level II Fire Alarm certifications for the two (2) technicians assigned to this project.

H. Provide shop drawings as follows:

1. Coversheet with project name, address and drawing index.

2. General notes drawing with peripheral device backbox size information, part numbers, device mounting height information, and the names, addresses, point of contact, and telephone numbers of all contract project team members.

3. Device riser diagram that individually depicts all control panels, annunciators, addressable devices, and notification appliances. Shall include a specific, proposed point descriptor above each addressable device. Shall include a specific, discrete point address that shall correspond to addresses depicted on the device layout floor plans. Drawing shall provide wire specifications, and wire tags shown on all conductors depicted on the riser diagram. All circuits shall have designations that shall correspond with those require on the control panel and floor plan drawings. End-of-line resistors (and values) shall be depicted.

4. Control panel termination drawing(s). Shall depict internal component placement and all internal and field termination points. Drawing shall provide a detail indicating where conduit penetrations shall be made, so as to avoid conflicts with internally mounted batteries. For each additional data gathering panel, a separate control panel drawing shall be provided, which clearly indicated the designation, service and location of the control enclosure. End-of-line resistors (and values) shall be depicted.

5. See section 3.04 DOCUMENTATION AND TRAINING for other documents relating to this section.

6. Device typical wiring diagram drawing(s) shall be provided which depict all system components, and their respective field wiring termination points. Wire type, gauge, and jacket shall also be indicated. When an addressable module is used in multiple configurations for monitoring or controlling various types of equipment, different device typical diagrams shall be provided. End-of-line resistors (and values) shall be depicted.

7. Device layout floor plans shall be created for every area served by the fire alarm system. CAD Files (AutoCAD v14.0 or 2000) shall be provided by the consulting engineer for the use of the fire alarm system equipment vendor in the preparation of the floor plans. Floor

plans shall indicate accurate locations for all control and peripheral devices. Drawings shall be NO LESS THAN 1/8 INCH SCALE. All addressable devices shall be depicted with a discrete address which corresponds with that indicated on the Riser Diagram. All notification appliances shall also be provided with a circuit address which corresponds to that depicted on the Riser Diagram. If individual floors need to be segmented to accommodate the 1/8" scale requirements, KEY PLANS and BREAK-LINES shall be provided on the plans in an orderly and professional manner. End-of-line resistors (and values) shall be depicted.

8. Contained in the title block of each drawing shall be symbol legends with device counts, wire tag legends, circuit schedules for all addressable and notification appliance circuits, the project name/address, and a drawing description which corresponds to that indicated in the drawing index on the coversheet drawing. A section of each drawing title block shall be reserved for revision numbers and notes. The initial submission shall be Revision 0, with Revision A, B, or C as project modifications require.

I. Battery calculations shall be provided on a per power supply/charger basis. These calculations shall clearly indicated the quantity of devices, the device part numbers, the supervisory current draw, the alarm current draw, totals for all categories, and the calculated battery requirements (which reflect a 20% DEGRADE, for 24 Hour supervisory, 45 minute alarm operation). Battery calculations shall also reflect all control panel component, remote annunciator, and auxiliary relay current draws. Failure to provide these calculations shall be grounds for the complete rejection of the submittal package.

J. Table of contents, product data sheets, sequences of operation, battery calculations, installation instructions, licenses, NICET certifications and B-Size (blackline) reduced shop drawings shall be provided by the fire alarm vendor as part of a single, spiral bound submittal book. The submittal book shall have laminated covers indicating the project address, SED number, system type, and contractor. The book shall consist of labeled dividers, and shall not exceed 9 ½" in width, and 11 ½" in height. No less than three (3) sets of submittal booklets shall be provided to the consulting engineer for review and comment. Additional copies may be required at no additional cost to the project.

K. Scale drawing sets shall be submitted along with the submittal booklets. These drawings may be either D-Size or E-Size Blueline drawings and of a sufficient resolution to be completely read. Sets shall be bound and folded so that is does not take up more than 100 square inches of space. No less than three (3) sets of scale drawing sets shall be provided to the consulting engineer for review and comment. Additional copies may be required at no additional cost to the project.

1.7 WARRANTY

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance or approval by AHJ. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The catalog numbers used are those of Edwards Systems Technology (EST) by GE Security, Notifier by Honeywell, addressable systems by Bosch, or approved equal, and constitute the type and quality of equipment to be furnished. For a list of EST authorized fire alarm vendors, contact Dana Ferrer at GE Security – dana.ferrer@ge.com. For Bosch, contact Jan Shaffer at jan.shaffer@verizon.net. For Notifier by Honeywell, contact Pete Webber at 203-484-7578 ex.5631.

B. If equipment of another manufacturer is to be submitted for approval as equal, the contractor shall, at the time of bid, list all exceptions taken to these Specifications, all variances from these Specifications and all substitutions of operating capabilities or equipment called for in these Specifications and forward said list to the Engineer. Any such exceptions, variances or substitutions that were not listed at the time of bid and are identified in the submittal, shall be grounds for immediate disapproval without comment. Final determination of compliance with these Specifications shall rest with the Engineer, who, at his discretion, may require proof of performance.

C. Alternate product submissions made without proof of no less than three (3) factory authorized and certified manufacturer's distributors residing within 50 miles of the project job site shall be rejected. These distributors must not only provide installation support, but must have a service organization capable of 24 hour emergency call service and must have been contracted and delivered no less than five (5) accepted projects using the submitted product over the past year.

D. Alternate product submissions based upon use of a product line considered proprietary in its distribution, design, application software, or ongoing maintenance and repair shall not acceptable. Proof of a product's non-proprietary nature shall be the burden of the contractor, and shall be in the form of written documentation. The determination of a product's compliance to this requirement shall be exclusively that of the Consulting Engineer.

F. All products used shall be of a single manufacturer. Submission of notification appliances, auxiliary relays, or documentation from other than a single manufacturer shall not be acceptable and will be grounds for immediate disapproval without comment.

2.2 WIRING INSTALLATION

A. Electrical wiring serving fire alarm systems shall comply with the following requirements:

1. Power conductors (above 75 volts) shall be:

   a. Copper: THHN, THWN/THHN, TFFN, TFN, FEP, RHH, RHW-2, XHH, or XHHW; minimum 600 volts; 90 C; for installation in rigid metallic conduit (RMC)intermediate metallic conduit (IMC) or electric metallic tubing (EMT).

   b. Cable type MI, listed for 2-hour fire resistance rating.

2. Low voltage conductors (75 volts and less) shall be:

a. Copper: THHN, THWN/THHN, TFFN, TFN, FEP, RHH, RHW-2, XHH, XHHW; minimum 600 volts; 90 C; for installation in RMC, IMC or EMT.

b. Minimum wire size No.18 AWG.

c. Multi-conductor cables run in raceways, or exposed as described hereinafter, and shall be listed to UL 1424-05, Standard for Cables for Power-Limited Fire-Alarm Circuits, with the listing agency certifying compliance with the following additional requirements:

1) Type FPLP only; minimum insulation thickness 15 mils; minimum temperature 150 C; colored red.

2) Red colored jacket overall; minimum thickness 25 mils.

3) Cable marked as per UL 1424 must bear additional description "ALSO CLASSIFIED NYC CERT. FIRE ALARM CABLE" legible without removing jacket.

3. Installation of conductors and raceways shall be in accordance with the following:

a. Power conductors shall not be installed in common raceways with low voltage conductors.

b. Installations shall comply with applicable requirements of the electrical code, or if the requirements of this rule exceed those of the electrical code shall comply with the requirements of this rule.

c. Conductors other than MI cable shall be run in raceway, except as specifically described in item (c)(3)(iv) of this rule.

4. Multi-conductor cables may be installed without raceway protection where cables are protected by building construction. Where not protected by building construction, cables shall be located 8 feet (2438 mm) vertical or more above the finish floor and not subject to physical tampering or hazard. Locations within 8 feet (2438 mm) of the finished floor that are deemed as protected by building construction shall include raised floors, shafts, telephone and communication equipment rooms and closets, and rooms used exclusively for fire alarm system equipment.

5. All wiring within mechanical and elevator equipment rooms shall be run in raceways.

6. Raceways run within 8 feet (2438 mm) vertical of the finish floor in garage

areas, loading docks, mechanical rooms, and elsewhere where subject to mechanical damage, shall be rigid galvanized steel conduit only.

7. Where wiring is required to be run in raceways, install conductors in RMC, IMC, or EMT except that multi-conductor cables may also be run in surface metal raceway. Flexible metallic conduit, not exceeding 36 inches (914 mm) in length, shall be permitted for final connections to initiating and notification devices. Conductors for other electrical systems shall not be installed in raceways containing conductors serving a fire alarm system.

8. Where allowed to be run without raceway protection, multi-conductor cables shall be installed as follows:

   a. Cables shall not depend on ceiling media, pipes, ducts, conduits, or equipment for support. Support independently from the building structure.

   b. Secure by cable ties, straps or similar fittings, so designed and installed as not to damage the cable. Secure in place at intervals not exceeding 60 inches (1524 mm) on centers and within 12 inches (305 mm) of every associated cabinet, box or fitting.

9. Installation of raceways, boxes and cabinets shall comply with the following general requirements:

   a. Covers of boxes and cabinets shall be painted red and permanently identified as to their use.

   b. Penetrations of fire-rated walls, floors or ceilings shall be fire stopped.

   c. Within stairways, raceways shall not be installed within 8 feet (2438 mm) vertical of the finish floor.

   d. Raceways or cables shall not penetrate top of any equipment box or cabinet.

10. All conduits supplying 120-volt power to the fire command station and/or fire alarm control unit and/or to outlying control cabinets, shall contain a green insulated grounding conductor sized in accordance with the electrical code (#10 AWG minimum). The grounding conductor shall be connected to the ground bus or other suitable grounding terminal in each box and cabinet in which it enters. At the fuse cutout panel supplying the fire alarm system, a grounding electrode conductor sized and installed in accordance with the electrical code (#10 AWG minimum) shall be provided.

11. For cabinets whose 120-volt supply is not derived from the main fire alarm system cutout panel, green insulated separate grounding electrode conductors, sized and installed as per the electrical code (#10 AWG minimum), shall be provided. In steel-framed buildings, a connection to local steel structure will be acceptable.

12. Splices and terminations of wires and cables shall be as follows:

    a. Permitted only in boxes or cabinets specifically approved for that purpose.

    b. Utilize mechanical connections specifically approved by UL 486A-03, Wire Connectors or UL 486C-04, Splicing Wire Connectors for the conductors, or if soldered, first joined so as to be mechanically and electrically secure prior to soldering and insulating. Temperature rating of completed splices shall equal or exceed the temperature rating of the highest rated conductor.

13. Wiring for audible notification devices – speakers (i.e. stairwells) shall be arranged so that a loss of a portion of the wiring in a stairwell will not render more than 60 percent of the devices of each type inoperative, and the devices shall be so connected to the circuitry (i.e., by means of alternate "A" and "B" circuits) as to maintain at least partial audibility throughout the entire stairwell.

2.3 CIRCUITING GUIDELINES

A. Each Signaling Line Circuit (SLC) shall be circuited so device loading is not to exceed 80% of loop capacity in order to leave for space for future devices. The loop shall have Class B operation. Each DGP shall include an SLC loop on a per floor basis. T-Tapping a selected loop to cover an alternate floor shall not be accepted.

B. NAC Circuits shall have Class B operation. Each of the following types of alarm notification appliances shall be circuited as shown on the drawings but shall be typically as follows:

    a. Audible Signals: Provide sufficient spare capacity to assure that the addition of five (5) audible devices can be supported without the need for addition control components (power supplies, signal circuit modules, amplifiers, batteries, etc.)

C. Visual Signals Provide sufficient spare capacity to assure that the addition of three (3) visual devices can be supported without the need for addition control components (power supplies, signal circuit modules, batteries, etc.)

D. The network riser shall be wired NFPA Style 7 (Class A with isolation).

E. Where it is necessary to interface conventional initiating devices provide intelligent input modules to supervise Class B zone wiring.

F. Each of the following types of devices or equipment shall be provided with supervised circuits as shown on the drawings but shall be typically as follows:

    a. Sprinkler Valve Supervisory Switches: Provide one (1) supervisory module circuit for each sprinkler valve supervisory switch.

    b. When waterflow and tamper switches exist at the same location, provide one (1) dual input addressable module. When odd numbers of devices exist at a single location, provide additional single input addressable modules.

G. Each of the following types of remote equipment associated with the fire alarm system shall be provided with a form 'C' control relay contact as shown on the drawings, but shall be typically as follows:

   a. HVAC Fan Systems: Provide one (1) shutdown control relay contact for each HVAC fan system.

   b. HVAC Supply Fans: Provide one (1) shutdown control relay contact for each HVAC supply fan.

   c. HVAC Return Fans: Provide one (1) shutdown control relay contact for each HVAC return fan.

H. Provide a dedicated 24VDC circuit to feed all auxiliary relays required for inductive loads. Circuits shall be supervised via an end-of-line relay and addressable input module. Auxiliary relays shall not derive their power from the starter or load being controlled.

I. Each control or data gathering panel shall have a minimum of a dedicated 20Amp-120VAC feed. An appropriate fuse cut out shall be included, wired as indicated in the Building Code for the City of NY.

2.4 FIRE ALARM SYSTEM SEQUENCE OF OPERATION

A. Refer to fire alarm drawing, FA-301, Fire Alarm Riser Diagram for the sequence of operation.

2.5 SUPPORT FOR INSTALLER AND OWNER MAINTENANCE

A. Provide a coded one-man walk test feature. Allow audible or silent testing. Signal alarms and troubles during test. Allow receipt of alarms and programmed operations for alarms from areas not under test.

B. Provide internal system diagnostics and maintenance user interface controls to display/report the power, communication, and general status of specific panel components, detectors, and modules.

C. Provide loop controller diagnostics to identify common alarm, trouble, ground fault, Class A fault, and map faults. Map faults include wire changes, device type changes by location, device additions/deletions and conventional open, short, and ground conditions. Ground faults on the circuit wiring of remote module shall be identified by device address.

D. Allow the user to display/report the condition of addressable analog detectors. Include device address, device type, percent obscuration, and maintenance indicator. The maintenance indicator shall provide the user with a measure of contamination of a device upon which cleaning decisions can confidently be made.

E. Allow the user to report history for alarm, supervisory, monitor, trouble, smoke verification, watchdog, and restore activity. Include Facility Name, Licensee, Project Program Compilation date, Compiler Version, Project Revision Number, and the time and date of the History Report.

F. Allow the user to disable/enable devices, zones, actions, timers and sequences. Protect the disable function with a password.

G. Allow the user to activate/restore outputs, actions, sequences, and simulate detector smoke levels.

H. Allow the service user to enter time and date, reconfigure an external port for download programming, initiate auto programming and change passwords. Protect these functions with a password.

I. THE END-USER SHALL RETAIN COMPLETE RIGHTS AND OWNERSHIP TO ALL SOFTWARE RUNNING IN THE SYSTEM. The fire alarm equipment vendor shall provide useable hard and soft copies of the software database to the End-User at the end of the warranty period. The database provided shall be useable by any authorized and certified distributor of the product line, and shall include all applicable passwords necessary for total and unrestricted use and modification of the database. The Consulting Engineer shall define the extent of hardcopy database documentation to be provided.

2.6 UL LISTED AND APPROVED EQUIPMENT

A. Fire Command Station/ Fire Alarm Control Panel Requirements: The fire alarm control panel or panels and all system devices (speaker-strobes, strobes, pull stations, smoke and heat detectors, etc. shall be Edwards Systems Technology (EST) by GE Security type EST3 series (or equal). All under one label "**UL listed and approved**" for the use of fire alarm systems in this area of the United States of America. The operating controls shall be located behind locked door with viewing window. All control modules shall be labeled, and all zone locations shall be identified.

B. System Controllers: The main controller 3-CPU shall be supervised, site programmable, and of modular design supporting up to 125 detectors and 125 remote modules per addressable Signaling line Circuit (SLC). The CPU shall support up to 10 SLC's per panel for a total system capacity of 2500 Intelligent Addressable points. The system shall be designed with peer-to-peer networking capability for enhanced survivability, with support for up to 64 modes, each with up to 2500 points and an overall capacity of 160,000 points. The cabinets shall be steel.

C. The system shall store all basic system functionality and job specific data in non-volatile memory. All site specific and operating data shall survive a complete power failure intact. Passwords shall protect any changes to system operations.

D. The Main Controller Module shall control and monitor all local or remote peripherals. It shall support a large 960 character LCD, power supply, remote LCD and zone display annunciators, printers, and support communication interface standard protocol (CSI) devices such as color computer annunciators and color graphic displays. Remote LCD annunciators shall also display each and every point in the system and be sized with the same number of characters as in the main FACP display.

E. The panel shall have an interface module for remote site monitoring. The control panel shall include built-in (part of the fire alarm control panel) Digital Alarm Communicator Transmitter (DACT)) module to transmit smoke, supervisory, waterflow, trouble, CO Alarm (if included), pump running, and pump trouble events to a Central monitoring Station (CMS) company. The DACT shall support dual telephones lines, Contact I.D. communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It shall be possible to delay AC power failure reports, auto test call, and be site programmable. The DACT shall be capable of transmitting every individual condition to the central station via Contact I.D. format. Selection of Contact

I.D. format SHALL be of the discretion of the engineer and building owner but shall be an available option. Contractors who choose a separate dialer must meet all of the above options and are responsible for all necessary added connections such as power (with FCO/FDS), conduit, wire, addressable interface modules etc.

F. The system shall have built-in automatic system programming to automatically address and map all system devices attached to the main controller. A minimum default single stage alarm system operation shall be supported with alarm silence, event silence, drill, lamp test, and reset common controls.

G. Advanced Windows-based System Definition Utility with Program Version Reporting to document any and all changes made during system start-up or system commissioning shall be used to maintain site specific programming. Time and Date Stamps of all modifications made to the program must be included to allow full retention of all previous program version data. It shall support programming of any input point to any output point. The system shall support the use of Bar Code readers to assist custom programming functions. It shall allow authorized customization of fundamental system operations using initiating events to start actions, timers, sequences and logical algorithms. The system program shall meet the requirements of this project, current codes and standards, and satisfy the local Authority Having Jurisdiction.

H. The system shall support distributed processor intelligent detectors with the following operational attributes; integral multiple differential sensors, automatic device mapping, electronic addressing, environmental compensation, pre-alarm, dirty detector identification, automatic day/night sensitivity adjustment, normal/alarm LEDs, relay bases, sounder bases and isolator bases.

I. The system shall use full digital communications to supervise all addressable loop devices for placement, *correct location*, and operation. It shall allow swapping of "same type" devices without the need of addressing and impose the "location" parameters on replacement device. It shall initiate and maintain a trouble if a device is added to a loop and clear the trouble when the new device is mapped and defined into the system.

J. Each controller shall contain a RS232 printer/programming port for programming locally via an IBM PC. When operational, each controller shall support a printer through the RS232 port and be capable of message routing.

K. Single stage operation shall be provided.

L. The system shall have a UL Listed Detector Sensitivity test feature, which will be a function of the smoke detectors and performed automatically every 4 hours.

M. The system shall support 100% of all remote devices in alarm and provide support for a 100% compliment of detector isolator bases.

N. All panel modules shall be supervised for placement and return trouble if damaged or removed.

O. The system shall have a CPU watchdog circuit to initiate trouble should the CPU fail.

P. The Fire Alarm / Life Safety System shall incorporate a true digital integrated audio system into the network, multiplexing 8 independent audio channels over a single pair of wires. The system

shall include distributed audio amplifiers, one for each speaker circuit, and split A/B speaker circuits for the ultimate in system survivability. The system shall provide a local temporal back up tone at each amplifier to allow evacuation signals to be broadcast in the protected premises in the event of a loss of data communication from the multiplexed audio riser. A digital message unit shall be provided which provides up to 32 minutes of pre-recorded emergency messaging. The message contained in the fully digital message unit shall be recordable in the field on a computer.

Q. Audio Source Unit (3-ASU): The Fire Alarm / Life safety System shall be provided with a fully integrated Emergency Communications System. The Emergency Communications System shall include a paging microphone, digital message playback unit, and 8 fully digitized and multiplexed Audio Channels. Four dedicated page mode control switches shall provide the emergency operator with instantaneous one touch paging to safely control the staged evacuation of building occupants. Automatic programming shall dynamically group the most frequently targeted paging zones. The "All Call" switch will direct the manual page to the entire facility. The " Page to Evac" switch will direct the manual page to those building areas automatically receiving the Evacuation Signal. The "Page to Alert" switch will direct the manual page to those building areas automatically receiving the Alert Signal. The "All Call Minus" switch will direct the manual page to those building areas which are programmed to receive the auxiliary and general channel connections such as stairwells. The system shall have paging control switches and LEDs to support specific zone selection as shown on the plans and on by floor basis. The zone control / displays shall confirm amplifier selection and annunciate amplifier and amplifier circuit trouble. The system shall automatically deliver a preannounce tone of 1000 Hz for three seconds when the emergency operator presses the microphone talk key. A 'ready to page' LED shall flash during the preannounce and turn steady when the system is ready for the user's page delivery. The system shall include a page deactivation timer, which activates for 3 seconds when the emergency user release the microphone talk key. Should the user subsequently press the microphone key during the deactivation period a page can be delivered immediately. Should the timer complete its cycle the system shall automatically restore emergency signaling and any subsequent paging will be preceded by the pre-announce tone.

R. Audio Amplifiers: Each audio power amplifier shall have integral audio signal de-multiplexers, allowing the amplifier to select any one of eight digitized audio channels. The channel selection shall be directed by the system software. Up to 8 multiple and different audio signals must be able to be broadcast simultaneously from the same system network node. Each amplifier output shall include a dedicated, supervised 25/70 Vrms speaker circuit that is suitable for connection of emergency speaker appliances. Each amplifier shall also include a notification appliance circuit rated at 24Vdc @ 3.5A for connection of visible (strobe) appliances. This circuit shall be fully programmable and it shall be possible to define the circuit for the support of audible, visible, or ancillary devices. Standby Audio amplifiers shall be provided that automatically sense the failure of a primary amplifier, and automatically program themselves to select and de-multiplex the same audio information channel of the failed primary amplifier, and fully replace the function of the failed amplifier. In the event of a total loss of audio data communications, all amplifiers will default to the local "EVAC" tone generator channel. If the local panel has an alarm condition, then all amplifiers will sound the EVAC signal on their connected speaker circuits. In the event of a loss of the fully digitized, multiplexed audio riser, the audio amplifiers shall automatically default to an internally generated alarm tone which shall be operated at a 3-3-3 temporal pattern. Audio amplifiers shall automatically detect a short circuit condition on the connected speaker circuit wiring, and shall inhibit itself from driving into that short circuit condition.

S. Audible notification appliances shall be affected by signal silence features. Visual signal appliance shall not be affected by signal silence features.

T. User Interface: The 3-LCDXL Display Module shall be of membrane style construction with a 24 line by 40-character (960 total characters) Liquid Crystal Display (LCD). The LCD shall use super-twist technology and backlighting for high contrast visual clarity and a colored gray/black and white display. In the normal mode the LCD shall display the time, a customer facility name, and the number of history events. In the alarm mode the LCD display the total number of events and the type of event on display. The LCD shall reserve 42 characters of display space for each user custom message by addressable device. The module shall have visual indicators for the following common control functions; Power, Alarm, Supervisory, Monitor, Trouble, Disable, Ground Fault, CPU fail, and Test. There shall be common control keys and visual indicators for reset, alarm silence, panel silence, and drill. Provide four pairs of display control keys for selection of event display by type (alarm, supervisory, monitor and trouble) and forward / backward scrolling through event listings. The operation of these keys shall be integrated with the related common control indicators to flash the indicators when undisplayed events are available for display and turn on steady when all events have been displayed. The LCD shall display the first event of the highest priority as well as the previous seven (7) alarm events "hands free" in chronological order so that the arriving firefighter may track the fires progression. Provide system function keys; status, reports, enable, disable, activate, restore, program, and test. The module shall have a numeric keypad, zero through nine with delete and enter keys.

U. Power Supplies: The power supply shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. The power supply shall provide internal power and 24 Vdc at 7.0A continuous for notification appliance circuits. The power supply shall be capable of providing 7A to output circuits for a maximum period of 100 ms. All outputs shall be power limited. The battery shall be sized to support the system for 24 hours of supervisory and trouble signal current plus general alarm for 45 minutes.

V. Auxiliary power supplies shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. The power supply shall provide internal power and 24 Vdc at 7.0A continuous for notification appliance circuits. The power supply shall be capable of providing 7A to output circuits for a maximum period of 100 ms. All outputs shall be power limited. The battery shall be sized to support the system for 24 hours of supervisory and trouble signal current plus general alarm for 45 minutes.

W. Network alphanumeric annunciators shall be located throughout the facility as indicated on the plans and in the fire safety director's office or constantly attended location. The system shall have the capacity to support 64 network annunciators or EST3 network panel nodes. Each annunciator shall contain a supervised, back lit, liquid crystal with a minimum of 8 line with 21 characters per line. Where required, the annunciator shall include additional zonal annunciation and manual control without additional enclosures. The annunciator shall support full ability to serve as the operating interface to the system and shall include the following features;

1. Matched appearance with other system displays, Each LCD Display on each node (cabinet) in the system shall be configurable to show the status of any or all of the following functions anywhere in the system: Alarm, Supervisory, Trouble, Monitor.

2. It must be possible to have up to 64 network annunciators or EST3 panels on the network.
3. Each annunciator must be capable of supporting custom messages as well as system event annunciation. It must be possible to filter unwanted annunciation of trouble, alarm or supervisory functions on a by point or by geographic area. The annunciators shall be mounted in stand-alone enclosures or integrated into the network panels as indicated on the plans.

2.7 COMPONENTS

A. Intelligent Devices — General: Each remote device shall have a microprocessor with non-volatile memory to support its functionality and serviceability. Each device shall store as required for its functionality the following data: device serial number, device address, device type, personality code, date of manufacture, hours in use, time and date of last alarm, amount of environmental compensation left/used, last maintenance date, job/project number, current detector sensitivity values, diagnostic information (trouble codes) and algorithms required to process sensor data and perform communications with the loop controller. Each device shall be capable of electronic addressing, either automatically or application programmed assigned, to support physical/electrical mapping and *supervision by location.* Setting a device's address by physical means shall not be necessary.

B. Intelligent Detectors — General: The System Intelligent Detectors shall be capable of full digital communications using both broadcast and polling protocol. Each detector shall be capable of performing independent fire detection algorithms. The fire detection algorithm shall measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted deceptive nuisance alarms. Signal patterns that are not typical of fires shall be eliminated by digital filters. Devices not capable of combining different fire parameters or employing digital filters shall not be acceptable. Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detector head. Distributed intelligence shall improve response time by decreasing the data flow between detector and analog loop controller. Detectors not capable of making independent alarm decisions shall not be acceptable. Maximum total analog loop response time for detectors changing state shall be 0.5 seconds. Each detector shall have a separate means of displaying communication and alarm status. A green LED shall flash to confirm communication with the analog loop controller. A red LED shall flash to display alarm status. The detector shall be capable of identifying up to 32 diagnostic codes. This information shall be available for system maintenance. The diagnostic code shall be stored at the detector. Each smoke detector shall be capable of transmitting pre-alarm and alarm signals in addition to the normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient "Environmental Thresholds" approximately six times an hour. The microprocessor shall continually monitor the environmental impact of temperature, humidity, other contaminates as well as detector aging. The process shall employ digital compensation to adapt the detector to both 24-hour long term and 4-hour short-term environmental changes. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 80% and 100% of the allowable environmental compensation value. Differential sensing algorithms shall maintain a constant differential between selected detector sensitivity and the "learned" base line sensitivity. The base line sensitivity information shall be updated and

permanently stored at the detector approximately once every hour. The intelligent analog detectors shall be suitable for mounting on any Signature Series detector mounting base.

C. Fixed Temperature/Rate of Rise Heat Detector, SIGA-HRS: Provide intelligent combination fixed temperature/rate-of-rise heat detectors SIGA-HRS. The heat detector shall have a low mass thermistor heat sensor and operate at a fixed temperature and at a temperature rate-of-rise. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. Systems using central intelligence for alarm decisions shall not be acceptable. The intelligent heat detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C) and a rate-of-rise alarm point of 15°F (9°C) per minute. The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.

D. Photoelectric Smoke Detector, SIGA-PS: Provide intelligent photoelectric smoke detectors SIGA-PS. The analog photoelectric detector shall utilize a light scattering type photoelectric smoke sensor to sense changes in air samples from its surroundings. The integral microprocessor shall dynamically examine values from the sensor and initiate an alarm based on the analysis of data. Systems using central intelligence for alarm decisions shall not be acceptable. The detector shall continually monitor any changes in sensitivity due to the environmental affects of dirt, smoke, temperature, aging and humidity. The information shall be stored in the integral processor and transferred to the analog loop controller for retrieval using a laptop PC or the SIGA-PRO Signature Program/Service Tool. The photo detector shall be rated for ceiling installation at a minimum of 30 ft (9.1m) centers and be suitable for wall mount applications. The photoelectric smoke detector shall be suitable for direct insertion into air ducts up to 3 ft (0.91m) high and 3 ft (0.91m) wide with air velocities up to 5,000 ft/min. (0-25.39 m/sec) without requiring specific duct detector housings or supply tubes. The percent smoke obscuration per foot alarm set point shall be field selectable to any of five sensitivity settings ranging from 1.0% to 3.5%. The photo detector shall be suitable for operation in the following environment: Temperature: 32°F to 120°F (0°C to 49°C), Humidity: 0-93% RH, non-condensing, Elevation: no limit.

E. 4D Multisensor Detector, SIGA-IPHS: Provide intelligent 4D multisensor smoke detectors SIGA-IPHS. The multisensor analog detector shall use a light scattering type photoelectric smoke sensor, a unipolar ionization smoke sensor and an ambient temperature sensor to sense changes in air samples from its surroundings. The integral microprocessor shall employ time based algorithms to dynamically examine values from the three sensors simultaneously and initiate an alarm based on that data. The 4D Multisensor shall be capable of adapting to ambient environmental conditions. The temperature sensor shall self-adjust to the ambient temperature of the surrounding air and input an alarm when there is a change of 65°F (35°C) in ambient temperature. Systems using central intelligence for alarm decisions shall not be acceptable. The detector shall continually monitor any changes in sensitivity due to the environmental affects of dirt, smoke, temperature, age and humidity. The information shall be stored in the integral processor and transferred to the analog loop controller for retrieval using a laptop PC or the SIGA-PRO Signature Program/Service Tool. Separately mounted photoelectric detectors, ionization detectors and heat detectors in the same location are not acceptable alternatives. The 4D Multisensor smoke detector shall be rated for ceiling installation at a minimum of 30 ft (9.1m) centers and suitable for wall mount applications. The 4D Multisensor shall be suitable for direct insertion into air ducts up to 3 ft (0.91m) high and 3 ft (0.91m) wide and air velocities up to 500 ft/min. (0-2.54 m/sec) without requiring specific duct detector housings or supply

tubes. The percent smoke obscuration per foot alarm set point shall be field selectable to any of five sensitivity settings ranging from 1.0% to 3.5%. The integral heat sensor shall cause an alarm when it senses a change in ambient temperature of 65°F (35°C) or reaches it fixed temperature alarm set point of 135°F (57°C) nominal. The 4D Multisensor detector shall be suitable for operation in the following environment: Temperature: 32°F to 100°F (0°C to 38°C), Humidity: 0-93% RH, non condensing, Elevation : Up to 6,000 ft (1828 m).

F. Standard Detector Mounting Bases, SIGA-SB / SIGA-SB4: Provide standard detector mounting bases SIGA-SB suitable for mounting on North American 1-gang, 3½" or 4" octagon box and 4" square box. The base shall, contain no electronics, support all Signature Series detector types and have the following minimum requirements: Removal of the respective detector shall not affect communications with other detectors, Terminal connections shall be made on the room side of the base, bases that must be removed to gain access to the terminals shall not be acceptable. The base shall be capable of supporting one (1) Signature Series SIGA-LED Remote Alarm LED Indicator. Provide remote LED alarm indicators where shown on the plans.

G. Duct Detector Housing, SIGA-SD: Provide model SIGA-SD Low profile intelligent addressable DUCT smoke detector as indicated on the project plans. Provide for variations in duct air velocity between 100 and 4,000 feet per minute and include a wide sensitivity range of .79 to 2.46%/ft. Obscuration. Include one Form-C shut down relay rated 2.0 amps @ 30 Vdc and also include slave high contact relays if required. Provide an air exhaust tube and an air sampling inlet tube that extends into the duct air stream up to ten feet. The addressable DUCT housing shall be suitable for extreme environments, including a temperature range of –20 to 158 degrees F (-29 to 70 degrees Celsius) and offer a harsh environment gasket option. Provide Remote Alarm LED Indicators SIGA-LED and/or remote test station model SD-TRK as indicated on the project plans.

H. Intelligent Modules — General: It shall be possible to address each Intelligent Signature Series module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Modules requiring EPROM, PROM, ROM changes or DIP switch and/or jumper changes shall not be acceptable. The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes which can be retrieved for troubleshooting assistance. Input and output circuit wiring shall be supervised for open and ground faults. The module shall be suitable for operation in the following environment: Temperature: 32°F to 120°F (0°C to 49°C), Humidity: 0-93% RH, non-condensing.

I. Single Input Module, SIGA-CT1 (Waterflow Detectors, Tamper Switches etc.): Provide intelligent single input modules SIGA-CT1. The Single Input Module shall provide one (1) supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The single input module shall support the following circuit types: Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.), Normally-Open Alarm Delayed Latching (Waterflow Switches), Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.), Normally-Open Active Latching (Supervisory, Tamper Switches).

J. Dual Input Module, SIGA-CT2: Provide intelligent dual input modules SIGA-CT2. The Dual Input Module shall provide two (2) supervised Class B input circuits each capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½" deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The dual input module shall support the following circuit types: Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.), Normally-Open Alarm Delayed Latching (Waterflow Switches), Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.), Normally-Open Active Latching (Supervisory, Tamper Switches).

K. Single Input Signal Module, SIGA-CC1: Provide intelligent single input signal modules SIGA-CC1. The Single Input (Single Riser Select) Signal Module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. When selected as a telephone power selector, the module shall be capable of generating its own "ring tone". The module shall be suitable for mounting on North American 2 ½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The single input signal module shall support the following operations: Audible/Visible Signal Power Selector (Polarized 24 Vdc @ 2A).

L. Control Relay Module, SIGA-CR: Provide intelligent control relay modules SIGA-CR. The Control Relay Module shall provide one form "R" dry relay contact rated at 2 amps @ 24 Vdc to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems. The position of the relay contact shall be confirmed by the system firmware. The control relay module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" deep 4" square boxes with 1-gang covers.

M. Intelligent Manual Pull Stations — General: It shall be possible to address each Signature Series fire alarm pull station without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable. The manual stations shall have a minimum of 2 diagnostic LEDs mounted on their integral, factory assembled single or two stage input module. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The station shall be capable of storing up to 24 diagnostic codes that can be retrieved for troubleshooting assistance. Input circuit wiring shall be supervised for open and ground faults. The fire alarm pull station shall be suitable for operation in the following environment: Temperature: 32°F to 120°F (0°C to 49°C), Humidity: 0-93% RH, non-condensing.

N. Manual Pull Station, SIGA-270: Provide intelligent single action, single stage fire alarm stations SIGA-270. The fire alarm station shall be of metal construction with an internal toggle switch. Provide a locked test feature. Finish the station in red with silver "PULL IN CASE OF FIRE" English lettering. The manual station shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers.

O. Notification Appliances – General: All appliances shall be UL Listed for Fire Protective Service. All strobe appliances or combination appliances with strobes shall be capable of providing the "Equivalent Facilitation" which is allowed under the Americans with Disabilities Act accessibility guidelines (ADA(AG)), and shall be UL 1971, and ULC S526 Listed. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel **(NO EXCEPTIONS)** specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturers' instructions. Any appliances that do not meet the above requirements, and are submitted for use must show written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from **THE CONTROL PANEL**

MANUFACTURER clearly stating that the control equipment (as submitted) is 100% compatible with the submitted Notification Appliances. Strobes, G1RF-VM Series: Provide EST Series G1RF-VM series low profile wall mounted strobes at the locations shown on the drawings. Strobes shall provide synchronized flash outputs. Strobe output shall be field selectable as indicated on the drawings in one of the following intensity levels; 15/75, 15cd, 30cd, 75cd or 110cd*. Low profile strobes shall mount in a North American 1-gang box or surface mounted on a matching back box provided by the manufacturer, as directed in the field. * The fire alarm vendor may select below 75 candela where allowed by the appropriate release of ADA. 15/75 strobes may be used in corridors and in locations where 15 candela is required per NFPA wall and ceiling tables (see NFPA 72).

P. Strobes, G1RF-VM Series: Provide EST Series G1RF-VM series low profile wall mounted strobes at the locations shown on the drawings. Strobes shall provide synchronized flash outputs. Strobe output shall be field selectable as indicated on the drawings in one of the following intensity levels; 15/75, 15cd, 30cd, 75cd or 110cd*. Low profile strobes shall mount in a North American 1-gang box or surface mounted on a matching back box provided by the manufacturer, as directed in the field.* The fire alarm vendor may select below 75 candela where allowed by the appropriate release of ADA. 15/75 strobes may be used in corridors and in locations where 15 candela is required per NFPA wall and ceiling tables (see NFPA 72).

Q. Provide speaker/strobes with a 4" cone as manufactured by EST, Cat. No. G4-S7 Series. The rear of the speaker shall be completely sealed protecting the cone during and after installation and screw terminals shall be provided for wiring. Speaker/strobe housings shall be red and include "FIRE" labeling. Speakers shall be provided for use with 70V systems and shall provide power taps at 1/4w, 1/2w, 1w, and 2w. Speaker/strobes shall provide UL confirmed 90 dBA sound output at 2w. Strobes shall provide 15/75, 30, 75 cd 110 candela* synchronized flash outputs. The strobe shall have lens markings oriented for wall mounting. Ceiling mounted Speaker/Strobes shall have lens markings with correctly oriented lettering. Speaker/strobes shall mount in a North American 4" electrical box with extension ring using the 2 screws provided with ring.* The fire alarm vendor may select below 75 candela where allowed by the appropriate release of ADA. 15/75 strobes may be used in corridors and in locations where 15 candela is required per NFPA wall and ceiling tables (see NFPA 72).

R. Multi-Voltage Control Relays, MR-200 Series: Provide remote control relays connected to supervised ancillary circuits for control of fans, dampers, door releases, etc. Relay contact ratings shall be DPDT and rated for 10 amperes at 115 Vac. A single relay may be energized from a voltage source of 24 Vdc, 24 Vac, 115 Vac, or 230 Vac. A red LED shall indicate the relay is energized. A metal enclosure shall be provided.

S. Electromagnetic Doorholders – General: Electromagnetic doorholders submitted for use must have written proof of their compatibility for the purposes intended. Such proof shall be in the form of documentation from all manufacturers that clearly states that their equipment (as submitted) is 100% compatible with each other for the purposes intended.

T. Wall Mounted, 1504/1505/1508/1509 Series: Provide flush, semi-flush or surface wall mounted electromagnetic doorholder/releases rated at 24 Vac/dc as directed by the Consulting Engineer. Finish shall be brushed zinc.

U. STI Stopper II Lexan Guards: Manual pull stations that are provided with STI Stopper II lexan guards shall include non-audible alarms as required on the plans. They shall be surface or flush mounting, as required for each individual device. Stopper Covers shall only be included on devices shown on the plans to include them.

V. Projected Beam Detector – Single End – Model GE/EST EC-50/100R. The projected beam type smoke detector shall be a 4-wire 12/24 Vdc device monitored by the Fire Alarm control panel through a two circuit SIGA-CT2 monitor module (one zone for alarm and one for trouble). The unit shall be listed to UL 268 and shall consist of an integrated transmitter and receiver. The beam detector shall operate between a range of 15 and 160 feet (4.57 and 48.77 m) or 160 and 330 feet (48.77 and 100 m)(contractor shall determine distance to select appropriate model). It shall feature automatic gain control, which will compensate for gradual signal deterioration due to dirt accumulation on the lenses. The unit shall include a wall mounting bracket. Testing shall be carried out using a calibrated test filter. It shall be possible to test the detector without direct access to it by means of a remotely installed key-operated test station.

W. Fuse Cut Out/Fused Disconnect Switch: The primary source of power and the secondary source of power shall each be provided with a means of disconnect from the fire alarm system. Each disconnect shall consist of a fused disconnect switch, locked in the ON position with key kept on premises accessible only to authorized personnel. Such disconnect shall be painted red and permanently identified as fire alarm circuit and labeled as to system/location served, with a means of interrupting the unfused neutral and all ungrounded conductors. For buildings served at up to 300 volts to ground, the service voltage shall be transformed to 120/208 volts and a fire alarm fused disconnect provided within a circuit length of ten 3.05 m (10 ft.), shall be connected at the transformer secondary on the 120/208 volt side. The fire alarm system fused disconnect switch on the transformer secondary side shall comply with the requirements of the primary and secondary power source fused disconnect switches specified above. Fused cutouts shall be provided where multiple circuits are required to support the fire alarm system and related auxiliaries mounted in a fused cutout panel suitable for the number of circuits needed. The Contractor shall provide an individual cartridge fused cut-out panel with three (3) poles and a removable, solid copper, neutral bar in fuse gap for the FCS, remote Data Gathering Panels (DGPs), booster power supplies and other fire alarm equipment. Fused cut-outs shall be provided with silver sand fuses, current limiting type with an interrupting capacity rating of 200,000 amps (r.m.s. symmetrical). The size of the fuses shall be sized appropriately but be thirty (30) amperes minimum. The fused cut-out panel shall bear an engraved white-core phenolic or bakelite identification nameplate stating in minimum one-quarter inch (1/4") high white letters on a red background "FIRE ALARM FUSED CUT-OUT". A four (4) wire feeder shall bring three phase 120/208 volt service to the fused cut-out. The feeder shall be tapped off the main building service ahead of the main service switch but after the Current Transformers (Metering Transformers).

PART 3 EXECUTION

3.1 INSTALLATION

A. The entire system shall be installed in a workmanlike manner, in accordance with approved manufacturer's wiring diagram. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. All wiring shall be of the type recommended by the manufacturer, approved by the local Fire Department and specified with in.

B. All penetration of floor slabs and firewalls shall be sleeved (1" conduit minimum) fire stopped in accordance with all local fire codes.

C. End of Line Resistors shall be furnished as required for mounting as directed by the manufacturer. Devices containing end-of-line resistors shall be appropriately labeled. Devices should be labeled so removal of the device is not required to identify the EOL device.

D. All manual pull stations shall be mounted 48 inches above the finished floor, as measured to the handle.

E. All audio/visual devices shall be mounted 80 inches above the finished floor, as measured to the lens. Devices shall be mounted no less than 6 inches from the ceiling. All audiovisual devices shall have lexan covers in all areas subject to mechanical damage.

F. No area smoke detectors shall be mounted within 36 inches of any HVAC supply, return air register or lighting fixture.

G. No area smoke or heat detector shall be mounted within 12 inches of any wall. All detectors shall be installed in strict accordance with NFPA 72 guidelines for such devices.

H. All mechanical rooms, boiler rooms, gymnasiums, wiring closets, custodian rooms, attic spaces, etc. or areas with no hung ceilings shall be piped with 3\4" conduit. All device plenum rated wiring shall be mechanically protected with conduit.

All areas in public view shall be in metal V-700 wiremold (or equal). All boxes must be painted red and labeled "FIRE ALARM".

I. All addressable modules shall be mounted within 36 inches of the monitored or controlled point of termination. This shall include, but is not necessarily limited to, fan shutdown, elevator recall, shunt trip, sprinkler status points, Ansul/Hood subsystems, or door release. Label all addressable modules as to their function.

J. New door holders shall derive their 24VAC/VDC power from a separate power supply housed in a dedicated, metal enclosure. The power supply shall have a 120VAC feed, and is to be centrally located to serve door holders on a per floor or area basis. All existing door holders shall be connected to new FACP. E.C. shall extend all existing wiring in order to make this work. Locations and quantities of door holder power supplies shall be referenced and submitted in the submission package for approval by the Consulting Engineer.

K. All low voltage wiring terminated to the fire alarm system shall be PLENUM RATED with no exceptions and no less than No. 18 AWG in size, and solid copper.

L. All line voltage (120VAC) wiring shall be no less than No. 12 AWG in size, and solid copper. This shall include all system grounding. FACP must have a DEDICATED 20 Amp circuit marked back at the power panel NO EXCEPTIONS.

M. All wiring shall be color-coded throughout, to National Electrical Code standards.

N. Power-limited/Non-power-limited NEC wiring standards SHALL BE OBSERVED.

O. All junction box covers shall be painted federal safety red and labeled FIRE ALARM SYSTEM ONLY in black letters.

P. Fire alarm system wiring shall not co-mingle with any other system wiring in the facility. Conduits shall not be shared under any circumstance. Only when fire alarm wiring enters the enclosure of a monitored or controlled system will co-habitation be permitted (i.e. at fan starters or elevator controllers). THIS WILL BE FIELD INSPECTED BY THE PROJECT ENGINEER.

Q. Fire alarm control panel enclosures shall have engraved labels indicating, "FIRE ALARM SYSTEM", and the areas of the building served by that panel.

R. Auxiliary relays shall be appropriately labeled to indicate "FIRE ALARM SYSTEM" and their specific function (i.e. FAN S-1 SHUTDOWN).

S. All fire alarm wiring shall be continuous and unspliced. Terminations shall only occur at fire alarm devices or control panel enclosures under terminal screws. All other splicing methods are specifically disallowed (i.e. plastic wirenuts).

T. All fire alarm wiring shall be installed using a dedicated system of supports (i.e. bridle rings). Fire alarm wiring shall not be bundled or strapped to existing conduit, pipe or wire in the facility. THIS WILL BE FIELD INSPECTED BY THE PROJECT ENGINEER.

U. All fire alarm wiring shall be sleeved when passing through any wall, using conduit sleeves (1" min.) with bushings, and fire stopped in accordance with Code.

V. The system shall be arranged to receive power from one three wire 120 Vac, 20 A supply. All low voltage operation shall be provided from the fire alarm control panel.

W. All fire alarm devices shall be accessible for periodic maintenance. Should a device location indicated on the Contract Drawings not meet this requirement, it shall be the responsibility of the installing contractor to bring it, in writing, to the attention of the Project Engineer. Failure to bring such issues to the attention of the Project Engineer shall be the exclusive liability of the installing Electrical Contractor.

X. The existing fire alarm system shall remain in operation until such time that approval has been granted for its removal. The installing Electrical Contractor shall be responsible for the upkeep of the existing system until such time that it can be removed.

Y. The installing Electrical Contractor shall be responsible for the removal of ENTIRE existing fire alarm system components and controls on the demolition drawing shown or not, upon approval of the AHJ and the Consulting Engineer. The End-User reserves the right to retain any existing fire alarm system components, upon their request. All existing fire alarm system components requiring special handling for disposal (due to radioactivity) shall be the responsibility of the installing contractor. Written proof of proper disposal by the installing contractor shall be required prior to release of outstanding retainage.

3.2 FIELD QUALITY CONTROL

A. The system shall be installed and fully tested under the supervision of a trained manufacturer's representative. The system shall be demonstrated to perform all of the function as specified.

B. The Installing Contract and the Fire Alarm System Vendor shall, upon the request of the Consulting Engineer or End-User, attend any and all project meetings for the purpose of accurately determining progress.

C. It shall be the responsibility of the installing contractor to assure that construction debris does not adversely affect any sensing devices installed as part of this project. Should it be deemed necessary by the Consulting Engineer, End-User or AHJ, the installing contractor shall be responsible for the cleaning of all smoke detectors prior to final acceptance.

3.3 TESTS

A. The fire alarm system vendor shall test the system in accordance with the manufacturer's requirements and NYC code. The vendor shall provide completed NFPA 72 reports to the Consulting Engineer for review and approval prior to final acceptance.

B. Each individual system operation on a circuit by circuit basis shall be tested for its complete operation. The procedure for testing the entire fire alarm system shall be set forth with the consent of the code enforcement official, the Engineer and the manufacturer.

3.4 DOCUMENTATION AND TRAINING

A. The contractor shall compile and provide to the owners three (3) complete manual on the completed system to include SITE SPECIFIC operating and maintenance instruction, catalog cuts of all equipment and components, as-built wiring diagrams and a manufacturer's suggested spare parts list. An operational Video, on DVD media, shall also be included.

B. In addition to the above manuals, the Electrical Contractor shall provide the services of the manufacturer's trained representative for **two (2)** separate calendar days for a period of four **(4) hours** per day to instruct the owners' designated personnel on the operation and maintenance of the entire system.

C. As-built drawings shall consist of the following:

1. Complete revision of all previously submitted drawings
2. Point-to-point depiction of all device wiring on the device layout floor plans.
3. One (1) set of B-size, laminated as-built drawings.
4. Two (2) sets of 30"x42"inch 1\16"=1' scale drawings showing all points of fire alarm. One set shall be submitted with the close-out documents. Second set shall be mounted in frame with a lexan cover. These drawing must be submitted to project Engineer or approval.

D. Turnover of all software database hard/soft copies shall be required. This shall include all possible programming software logs, diskettes or CDs containing exported project files, hard copies of all device maps, the revision number of the version of programming utility used, and all required passwords. The turnover of all database information shall occur prior to the end of the One (1) warranty period (or period as amended earlier in this specification).

END OF SECTION 28 3100

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SECTION 312000

EARTHWORK

PART 1.0 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Work of this Section shall be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver, and perform all work of this Section as shown on the drawings, as specified herein, and/or as required by job conditions.

1.02 DESCRIPTION

A. Scope of Work:

This work includes but is not necessarily limited to the following:

1. Excavation for all building foundations.
2. All excavation and backfill for utility trenches shall be by the other separate trades;
3. Protection of all existing utility lines as required;
4. Design, provide materials, and install temporary sheeting, bracing and shoring for the earthwork as required;
5. Removal of all fill soils under the new building and replace with controlled compacted backfill.
6. Dewatering of excavations and drainage control during earthwork operations, as required;
7. Supply and installation of all backfill around all the foundations;
8. Compaction and fine grading of the earth to receive the subbase for the slab on grade;
9. Supply and installation of the subbase under all slabs on grade;
10. Disposal of all excavated materials not used as backfill on the site;
11. Temporary Protection around all open excavations, as required by local codes and the OSHA Code.

B. Related Work Specified Elsewhere:

1.	Cast in Place Concrete	Section 033000
2.	Plumbing	Section 220500
3.	Heating and Ventilation	Section 230500
4.	Electrical	Section 260500

1.03 QUALITY ASSURANCE

A. Qualifications:

1. The Earthwork Contractor shall have the experience, personnel and proper equipment to satisfactorily perform the earthwork operations as shown and specified, and shall list three projects which he has successfully completed equal to the quality and magnitude of this project.

B. Surveys and Boring Information:

1. Borings:

The following soil borings data is available for the Earthwork Contractor in Appendix A:

"Record of Borings and Test Pits" prepared by Carlin – Simpson & Associates, dated February 22, 2010.

2. No representations or warranties are made to the accuracy or completeness of the soil borings and they are not considered Contract Documents.

C. Rules, Permits and Certificates:

1. The Earthwork Contractor shall pay for fees and services, give notice, file necessary drawings (except for drawings furnished and filed by the Architect) and obtain permits and certificates of approval required in connection with work under this Contract. He shall comply with laws, ordinances, rules and regulations of departments having jurisdiction over this work. No work shall be performed until required permits are obtained.

D. Testing:

1. The Owner will engage and pay for an independent testing laboratory for all field testing and inspection for work of this Section.

E. Code and Specification Compliance:

The work shall comply with the following standard Codes and Specifications:

1. N.Y.C. Building Code - Latest Edition.

2. The AASHTO Specifications, Latest Edition.

3. The ASTM Specifications, Latest Edition, as referenced herein.

4. OSHA Code, Latest Edition.

1.04 JOB CONDITIONS

A. Provide sound, level bearing surfaces.

B. All wall footings to bear on the natural undisturbed soils at the sites, or on controlled compacted backfill. Provide sound, level bearing surfaces.

C. Benchmarks: Protect all monuments, benchmarks and property boundary pins. Replace if destroyed by Contractor's operation.

D. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner 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 and used by Owner or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.

3. Demolish and completely remove from site existing underground utilities indicated to be abandoned. Coordinate with utility companies for shut-off of services if lines are active.

PART 2.0 - PRODUCTS

2.01 MATERIALS

A. Backfill:

1. Controlled compacted fill shall consist of the soil required to fill in the areas where the unacceptable fill materials were excavated and as required to reach bearing elevations.

2. Backfilling shall consist of filling excavated areas adjacent to foundations, footings, retaining walls and other construction below finish grade, as required to bring subgrades to proper elevations.

3. New backfill and compacted fill materials under the building and around the inside and outside of the exterior footings and grade beams shall be furnished by the Contractor under this Section and shall be of bank run sand and gravel, free from rubbish, debris, sod, roots, or artificial material. It shall comply with the following gradation requirements:

U.S. Sieve Size	Percent Fines by Weight
2 in.	100
1/4 in.	70 to 100
No. 40	10 to 60
No. 200	0 to 15

4. Acceptability of the material will be determined at the job site, by the independent testing laboratory. Classification of soils shall be as per ASTM D-2487.

C. Base Course Under Building Slabs on Grade:

1. The naturally occurring sand at the site may be used for this.

2. As an alternate, this subbase shall consist of crushed stone, gravel with the following gradation requirements:

Sieve Size	Percent Fines by Weight
1 inch	100
3/4 inch	65-100
No. 4	40-75
No. 50	5-30
No. 200	0-7

D. All of the above materials shall be free of debris, waste, frozen materials, vegetable and other deleterious matter.

PART 3.0 - EXECUTION

3.01 CONTRACTOR'S REVIEW

The Earthwork Contractor shall do the following:

A. Study the contract drawings and Specifications with regard to the work as shown and required under this Section so as to insure its completeness.

B. Examine conditions in which this work is to be performed and notify the Architect if any exist which are detrimental to the proper and expeditious performance of the work. Starting on the work shall imply acceptance of the conditions to perform the work as specified.

C. Cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

3.02 CONTRACTOR'S RESPONSIBILITY

A. Prior to the commencement of work, the Contractor shall have examined all drawings and Specifications, shall have visited the site, consulted the records of adjacent construction and of existing utilities and their connections, and noted conditions and limitations which may influence the work of this Section.

B. The Contractor shall take all necessary precautions to guard against settlement or collapse of structures adjoining the new work. He shall protect public and private property adjacent to the job site, including existing building foundations, existing utilities, light standards, hydrants, and signs. The Contractor shall at his own expense, make repairs to damaged property necessitated by reason of, or occurring in the course of operations under this Contract, to the complete satisfaction of the Owner of the damaged property.

C. The Contractor shall be totally responsible for safety measures taken by him during the progress of the work.

D. The Contractor shall retain, at his own expense, the services of a Professional Engineer to advise on all construction techniques involved in the work, including the design, checking and approval of temporary bracing, shoring, underpinning and other items pertinent to the work, and on construction methods for solution of problems which may be encountered during the course of the work. This is critical for the deeper excavation required. The Contractor's Engineer shall consult him on construction methods which will eliminate the risk of settlement and/or damage to the existing structure adjacent structures, utilities and facilities on the Owner's property and on property adjoining the site of the work. The contractor shall provide shop drawings of the underpinning and temporary wall bracing, signed and sealed by the P.E. retained, to the Architect for review. The temporary shoring and bracing methods will be subject to review by the Architect.

E. The Contractor shall maintain general natural drainage of the property during earthwork operations. Should flooding of work areas occur, remove all water by pumping or other means as described under Section 3.05 of this Specification.

F. The Contractor shall lay out the work completely and in accordance with the drawings and the reference points. Safeguard all reference stakes, points and bench marks and replace same if disturbed or removed by negligence or without prior approval. Cooperate in protecting temporary stakes during the progress of the Work.

G. The Contractor shall maintain and protect newly graded areas from the actions of the elements. Any settlement or washing that occurs prior to acceptance of the work, shall be repaired and grades re-established to the required elevations and slopes.

H. The Contractor shall execute the work with promptness and diligence, but excavation or filling shall not be done when the ground is frozen or too wet for proper compaction as determined by the independent soils engineer. Claims for extra payment resulting from weather conditions will not be considered.

I. Quantities for unit price work shall be determined and certified by the Contractor and may be verified by the Owner's surveyor.

J. The Contractor shall remove and properly and legally dispose of all excavated material.

K. The Contractor shall keep all roads, public and private, free of dirt, mud, snow, ice and debris resulting from this work.

L. Where backfill, or subbase materials must be moisture conditioned to reach optimum moisture content, apply water uniformly to prevent free water from appearing on surface during or subsequent to compaction operations.

3.03 PROTECTION OF EXISTING UTILITIES

A. Active Services:

1. The Contractor shall locate all existing utilities prior to the excavation work. Drawings of these utilities will be provided, to the extent that these drawings exist, to the Contractor by the Owner and Architect. However, these drawings are not "as built" drawings, and the Contractor must locate all existing utilities by field investigation.

2. If the location of the existing utilities cannot be exactly determined prior to excavation, the contractor shall carefully excavate the areas where utilities could exist, until these utilities are located.

3. When encountered in the work, existing sewer, water, gas, electric and other utility services and structures shall be protected by the Contractor at all times and, where required for the proper execution of the work, shall be relocated as directed by the Architect.

4. Existing utility services, if damaged during the earthwork operations, shall be immediately repaired, protected, and maintained in use by the Contractor until relocation of same has been completed, or shall be cut and capped or shall be prepared for service connections as directed by the Architect. This work shall be done at no cost to the Owner and to the satisfaction of the Owner, utility company and local municipal body having jurisdiction.

B. Inactive Services:

1. When encountered in the work, whether or not indicated on the drawings, all existing inactive sewer, water, gas, electric and other utility services and structures which interfere with the execution of the work shall be removed, capped or plugged or otherwise discontinued by the Contractor as directed by the Architect.

2. The Contractor shall notify all municipal agencies and service utility companies having jurisdiction over the above surface and subsurface utilities; and all

protecting, relocating, removal and discontinuing of those services shall be in accordance with their requirements.

3.04 EXCAVATION

The following classifications of excavation will be made with reference to excavation encountered in work:

A. Earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, unacceptable fill materials and materials of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock excavation or unauthorized excavation.

B. Rock excavation in open excavations includes removal and disposal of materials and obstructions encountered which cannot be dislodged and excavated with modern track-mounted heavy-duty excavating equipment, without drilling.

1. Typical of materials classified as rock are boulders 1/2 cu. yd. or more in volume, solid rock, rock in ledges, and rock-hard cementitious deposits.

C. Do not perform rock excavation work until material to be excavated has been cross-sectioned by licensed surveyor employed by Owner and classified by Geotechnical Engineer. Base the Bid for the work of this section on a total rock excavation computed by using the rock elevations shown on the drawings. Contract Sum will be adjusted for greater or smaller amount of actual rock excavation on basis of Unit Prices stated in the Contract and in accordance with Contract conditions relative to changes in work.

D. Rock payment lines are limited to the following:

1. Six inches outside of concrete work for which forms are required.

2. In pipe trenches, 6" below invert elevation of pipe and 2 ft. wider than inside diameter of pipe, but not less than 3 ft. minimum trench width.

3. Neat outside dimensions of concrete work where no forms are required.

4. Under slabs on grade, 6" below bottom of concrete slab.

E. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect.

F. Additional excavation: When excavation has reached required sub-grade elevations, notify geotechnical engineer who will make an inspection of conditions. Geotechnical services will be paid by the Owner.

1. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Architect.

2. Removal of unsatisfactory material and its replacement as directed will be paid on basis of unit prices forming part of contract conditions.

3.05 PUMPING AND DEWATERING

A. Pumping shall be at the expense of the Contractor. The pumping work shall include adequate pumps, hoses, strainers and other appurtenances, fuel, power, trench drains, pumps and sheeting required in connection with pumping, as well as labor and maintenance.

B. Water shall not be allowed to stand in excavated areas. Water that accumulates in excavated areas shall be removed by the Contractor with pumps or other approved means. The Contractor shall provide pumps of sufficient capacity to remove water while excavations are being made and until footings are complete. Discharge of excess water shall be to appropriate points away from the site, as directed by the Architect.

C. The Contractor shall control grading in the vicinity of the proposed building so that the ground is properly sloped to prevent water running into the excavated areas.

D. The Contractor shall remove snow and ice as it accumulates so as not to interfere with building operations or pedestrian traffic.

E. Drainage into the storm water system when conditions warrant shall be met by the Contractor properly constructing settlement pits or other means and methods as approved by the Architect.

3.06 CONTROLLED COMPACTED FILL

A. This shall consist of filling and compacting excavated areas and areas where unacceptable fill soil was under the building footprint and work the seating structure on grade, to the proper bearing level.

3.07 TEMPORARY SHEETING SHORING AND BRACING

A. Temporary sheeting shoring and bracing shall be provided where required to maintain excavation banks in a safe and stable condition or where required for the protection of adjoining structures. Sheeting shoring and bracing shall consist of sound timbers or rolled structural shapes of the required dimensions. Sheeting shoring and bracing shall safely support the property to be protected. All temporary protection shall be removed when no longer required and/or as directed by the Architect.

B. For requirements on design of shoring and bracing, see 3.02D.

3.08 DEMOLITION

Demolish and legally dispose of any old foundation walls and old foundations buried within the property line. These walls are either fully buried or exposed at their top. Remove to a depth of at least 2'-0" below the bottom of the new foundations.

3.09 BACKFILLING AT BUILDING EXCAVATIONS

A. Backfilling shall consist of filling excavated areas adjacent to foundations, footings, walls and other construction below finish grade, with the backfill material specified in 2.01A.

B. Controlled compacted fill and backfilling operations shall not commence until all the following conditions are met:

1. Observation of foundation excavations and foundation structures by the soil testing engineer and the Architect.

2. Structure has developed structural integrity, as determined by the Architect.

C. The Earthwork Contractor shall:

1. Place and compact controlled fill and backfill material so as to reduce the risk of settlement and damage to foundations, walls, etc. Fill and backfill materials shall be brought to subgrade elevations as noted on the drawings.

2. Prior to backfilling, compact subgrades to 90% of their maximum dry density as per ASTM D-698. If a subgrade displays elasticity or deformation under the construction equipment and the specified density cannot be obtained, excavate the material. Excavate to a depth at which, when replaced and recompacted at a moisture content not exceeding optimum, the subgrade shall not display elasticity or deformation.

3. Controlled fill and backfill shall be placed in maximum 8 in. thick loose layers and be compacted to 95% of its maximum dry density as determined by ASTM D-1557.

4. If fill and backfill are placed during freezing weather, do not use material, which has frozen. The Contractor shall remove the material which freezes overnight from the top of the fill prior to commencement of fill placement.

5. Crown and seal the top of the fill areas at the end of each working day to minimize the infiltration of water in the event of rainfall. Remove the top of the fill areas, which exceed 2% optimum moisture due to rainfall prior to additional fill placement.

6. Run at least one field density test for each lift of fill placed.

7. Convey density report to the General Contractor and testing Engineer for each layer, before the next layer of fill is placed and compacted. Field density test shall be in accordance with ASTM D-1556, or ASTM D-2167.

8. Compact subbase (crushed stone) under slab on grade to 95% maximum density as per ASTM D-1557.

9. Submit final copies of all density reports to the Architect for his records, at the conclusion of backfill and compaction operations.

10. During compaction, suitable equipment shall be used to trim the ridges and fill in depressions. A series of density samples shall be taken from the first layer to determine the quality of compaction procedures before the second lift is spread.

END OF SECTION

SECTION 32 1000

BASES, BALLASTS, AND PAVING

PART 1. - GENERAL

1.1 RELATED DOCUMENTS & WORK

A. All of the Contract Documents, including General Agreement and Supplementary Conditions and Division 1 - General Requirements, apply to the work of this Section.

1. LEED Submittals - Section 013329.
2. Construction Waste Management - Section 017419.
3. LEED Requirements - Section 018113.j
4. Environmental Practices - Section 018116.
5. Construction IAQ Management - Section 018119.
6. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings – Section 018419.
7. Earthwork - Section 312000.
8. Imprinted Asphalt and Asphalt Coatings – Section 321223.
9. Concrete Curbs – Section 321313.

1.2 DESCRIPTION

A. Prepare and submit a Builder's Pavement Plan with the New York City Department of Buildings (DOB) / New York City Department of Transportation (DOT).

B. Furnish and install pavement, sidewalks, and curbing required during construction in accordance with approved Builder's Pavement Plan.

C. Provide stone base material, asphaltic concrete binder and wearing course, concrete, steel-faced curbs, and wire mesh reinforcing.

D. Pavement striping and markings.

E. General Requirements:

1. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.
2. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other

sections of this specification include: heat island effect; use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.3 SUBMITTALS

A. Submit Builder's Pavement Plan. The Professional Engineer shall file and obtain an approved Builder's Pavement Plan with the DOB/DOT, which the Contractor will need to obtain a construction permit for the Work. The approval will be valid for a period of one (1) year. RP 10-129 was approved by the DOB/DOT on 12/07/2011.

B. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The Contractor and their Subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:
   a. Cost breakdowns for the materials included in the Contractor's or Subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets,

manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per Subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: For each product specified, include technical data and tested physical and performance properties.

C. Samples: Color samples for pavement and concrete.

D. Drawings: For striping.

E. Job Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

F. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners and other information specified.

G. Material Certificates: Certificates signed by manufacturers certifying that each material complies with specified requirements.

H. Installer Qualifications: Engage an experienced installer who has completed hot-mix asphalt paving similar in material, design and extent to that indicated for this Project and with a record of successful in-service performance.

I. Firm shall be a registered and approved paving mix manufacturer with authorities having jurisdiction or with the DOT of the state in which the project is located.

J. Asphalt-Paving Publication: Comply with AI's "The Asphalt Handbook," except where more stringent requirements are indicated.

K. Preinstallation Conference: Conduct conference at Project site to comply with requirements related to asphalt paving including, but not limited to, the following:

1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
2. Review condition of substrate and preparatory work performed by other trades.
3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
4. Review and finalize construction schedule for paving and related work. Verify availability of materials, paving Installer's personnel and equipment required to execute the Work without delays.
5. Review inspection and testing requirements, governing regulations and proposed installation procedures.
6. Review forecasted weather conditions and procedures for coping with unfavorable conditions.

1.4 REFERENCES

A. The City of New York, Department of Transportation, Bureau of Highways, Roadway Division, Standard Details of Construction manual.

1.5 PERMITS

A. The Contractor shall obtain all necessary permits for construction of the Work.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 SAFETY

A. The Contractor shall post signs for safety. Local traffic is to be maintained at all times. A flag man should be used to direct traffic when necessary.

B. During performance of the Work, the Contractor must take all reasonable precautions to protect the site. The Contractor shall provide, place and adequately maintain sufficient guards, lights, barricades and enclosures. The Contractor shall retain steel roadway plates on-site for trench protection during construction.

C. All materials are to be stored within the property. No stock piling material or equipment in the street.

D. The Contractor is responsible for utility company notification – Code 53.

E. It is recommended that the Contractor take some photographs of the area before the commencement of the work.

1.8 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary. The contractor shall not accept delivery of any damaged materials to the site. Damaged materials shall not be used. The inspector shall have final say over any materials in question.

1.9 QUALITY ASSURANCE

A. Materials and Methods of Construction Shall Comply with the Following Standards:
1. American Society for Testing and Materials (ASTM).
2. American Association of State Highway and Transportation Officials (AASHTO).
3. Asphalt Institute (AI).
4. National Crushed Stone Association (NCSA).
5. International Slurry Seal Association (ISSA).

A. Provide material furnished by a bulk asphaltic concrete producer regularly engaged in the production of hot-mix, hot-laid asphaltic concrete paving materials.

C. Testing and inspection of bituminous pavement shall be made by an Independent Testing Agency paid for by the City of New York.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt material if substrate is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 deg. F.
2. Asphalt Base Course: Minimum surface temperature of 60 deg. F. at time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg. F. at time of placement.

PART 2. - PRODUCTS

2.1 MATERIAL

A. ROADWAY PAVEMENT

1. Roadway base to be repaired in kind; if stone base – base to consist of eight (8) inches of dense graded stone, if concrete base – base to consist of six (6) to nine (9) inches of concrete or equal to existing.

2. Pavement of interior parking lot and or dog runs and kennels shall consist of asphaltic concrete with asphaltic concrete binder on eight (8) inches of dense graded stone base where noted.

3. Asphaltic concrete wearing course shall be two (2) inches in thickness when compressed.

4. Asphaltic concrete binder and wearing course mix shall have the following gradation and bitumen requirements:

Percent by Weight

Passing	Binder	Wearing Course
1-1/2 inch	100	------
1 inch	90-100	------
1/2 inch	30-55	100
3/8 inch	-----	80-100
No. 4	-----	45-75
No. 8	10-25	35-60
No. 50	-----	6-25
No. 200	-----	2-8
Bitumen	4-6	5-8

5. Base material shall be sound, hard, durable broken stone, free from any organic or other deleterious material and well graded as follows:

Sieve Size	Percent Passing (by weight)
1 inch	100
1/2 inch	75-90
No. 4	40-55
No. 8	30-45
No. 30	16-27
No. 50	12-19
No. 200	3-7 (dry analysis)

B. STEEL-FACED CURBING

1. Structural steel as per board of standard specifications 20-S-35 type A-1 (ASTM designation A36).

2. Concrete to be class B-32, air entrained.

C. CONCRETE SIDEWALK

1. All materials and construction methods used are to conform to section #4.13 of the bureau of highway operations standard specifications, latest edition.

2. Welded wire fabric, where specified, shall be ASTM designation A-185, gauge #8/8 at 6" x 6" spacing, and conform to section #2.25 of the bureau of highway operations specifications, latest edition.

3. Sidewalk base to consist of gravel or broken stone as per standard specifications.

D. AUXILLIARY MATERIALS

1. Pavement Marking Paint: refer to Asphalt Coatings – Section 321223.

PART 3. - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where bituminous pavement is to be installed and correct any conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected to permit proper installation of the Work.

3.2 PREPARATION

A. Proof roll the sub-grade and do all necessary rolling and compacting to obtain firm, even sub-grade surface. Fill and consolidate depressed areas. Remove incompatible materials, replace with clean fill, and compact to 95% of the maximum dry density in accordance with ASTM D 1557.

B. Frame Adjustment
1. Verify frames for manholes, catch basins, and other such units, within areas to be paved, are at their proper elevations.
2. Adjust frames as required to match paving. Provide temporary closures over openings until completion of roller operations. Remove closures at completion of the work. Set covers to grade, flush with the surface of adjoining pavement surface.

C. Coordinate junction of new and existing pavement. Saw cut existing pavement to provide a uniform straight line transition. Meet existing surface levels and maintain drainage slopes. Feathering of transitions is not acceptable.

D. Repair existing pavement before installing new surface materials. Cut out depressions a minimum depth of 1" with vertical cuts. Install fresh surface materials and compact with rolling equipment. Feathering of patches is not acceptable. Apply tack coat to contact surfaces of existing pavement, curbs, and structures abutting pavement.

3.3 INSTALLATION

A. GENERAL

a. Comply with Asphalt Institute (AI) MS-3 Asphalt Plant Manual for material storage, control and mixing, and for plant equipment and operation.

b. Transport asphaltic concrete mixtures from the mixing plant to the project site in trucks with tight, clean compartments.

c. Thoroughly clean existing pavement surfaces by air blowing, brooming or vacuuming before starting repair or resurfacing operations.

B. ROADWAY PAVEMENT

a. Restoration of the existing roadway pavement to be saw-cut to the limit of the new asphaltic concrete wearing course. Remove the existing asphalt between the new curb and the saw-cut line. Replace the existing roadway base (if necessary) adjacent to the new curb and then install the new three (3) inch asphaltic concrete wearing course.

b. The maximum temperature of any batch immediately after mixing shall not exceed 350 degrees F and the minimum temperature of the mixture when delivered to the site shall not be below 250 degrees F.

c. No asphaltic concrete mix shall be spread on the dense graded stone base unless the base is clean and free from water.

d. All utility boxes or valves, all manholes and drains shall be to proper grade before starting the paving work.

e. Rolling of asphaltic concrete shall be done with tandem type power driven rollers weighing not less than ten (10) tons and not less than two hundred twenty five (225) pounds per inch width of main roll.

f. Rolling shall proceed continuously at the following rates: (1) for asphaltic concrete spread by hand, not in excess of 300 square yards per hour per roller, (2) for asphaltic concrete spread by machine, not in excess of 400 square yards per hour per roller.

g. Pavement base shall consist of 4 or 6 inches, in thickness when compressed, of dense grade stone.

h. The spreading of any layer of the base material shall be done with spreader equipment approved by the engineer, and shall be spread to such thickness that the maximum depth of the layer, after compaction, will be 4 or 6 inches.

i. When moisture content of the layer is within the limits for proper compaction, the entire surface shall be rolled with a pneumatic tired roller, having an operating weight of between 1,000 and 2,500 pounds per tire, or a smooth steel wheel roller, having a minimum weight of ten tons. Each portion of the layer shall be covered by a minimum of eight passes of the roller.

j. For heavier, vibratory or more efficient types of approved compaction equipment, the minimum number of passes required on all portions of each layer shall be determined by the engineer after appropriate field tests

to evaluate the efficiency of such equipment. In limited areas, where the use of a roller is impractical, approved vibrating plate compactors or impact rammers shall be used to compact the material.

k. After compaction, the top surface of this base shall not extend above, nor more than ½ inch below, true grade and surface at any location. The base, at any location, shall be compacted, finished and completed to the above tolerance and approved by the engineer, before any succeeding pavement course is placed at that location. Any depressions or holes shall be filled with the approved coarse sand or screening and the surface re-rolled.

l. Joints: construct joints to ensure continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surface and apply tack coat.
2. Offset longitudinal joints in successive courses a minimum of 6 inches.
3. Offset transverse joints in successive course a minimum of 24 inches.
4. Construct transverse joints by bulkhead method or sawed vertical face method as described in AI's "The Asphalt Handbook."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

m. Installation Tolerances:

1. Thickness: compact each course to produce the thickness indicated on drawings within the following tolerances:

    1. Base Course: Plus or minus 1/4".

    2. Surface Course: Plus 1/4", no minus.

2. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10 foot straightedge applied transversely or longitudinally to paved areas:

    1. Base Course: ¼".

    2. Surface Course: ¼".

    3. Crowned Surfaces: test with crowned template centered and at right angles to crown. Maximum allowable variance from template is ¼".

C. STEEL-FACED CURBING

a. Expansion joints in the steel curb facing and concrete backing shall be at a maximum spacing of 24 feet.

b. The expansion joints of the curb and steel curb facing shall line up with the expansion joints of the concrete sidewalks.

c. No piece of steel curb facing having less than two (2) welded dowels may be installed unless it is welded to the adjacent steel curb facing.

d. ½" diameter x 5" headed anchor studs (granular of solid flux filled) may be substituted.

e. Surface to be painted shall be thoroughly cleaned and then painted in accordance with DOT specifications, latest revision.

f. Where two (2) pieces of steel curb facing are joined but not welded, two (2) one-half (1/2) inch rods, twenty four (24) inches long shall be inserted into the concrete backing, one-half (1/2) the length at each side of the joint.

g. Splay for steel faced drop curb driveway shall be 2'-6" for commercial application.

D. CONCRETE SIDEWALK

h. Sidewalk, outside driveway, and all interior site walkways to be four (4) inch thick concrete atop six (6) inch gravel or broken stone as per standard specification.

i. Sidewalk, in driveway, to be seven (7) inch thick concrete with welded wire fabric #8/8 at 6" x 6" spacing atop six (6) inch gravel or broken stone as per standard specification.

3.2 MATERIALS

A. ASPHALT – suggested vendors or approved equal:

1. Vanbro Co.
   1900 South Avenue
   Staten Island, NY 10314
   PH 718-761-3164

2. Weldon Materials, Inc.
   200 Marshes Dock Road
   Linden, NJ 07036
   PH 888-322-231

3. Tilcon

Foot of Crows Mill Road
Keasbey, NJ 08832
PH 800-789-7625

B. CONCRETE – suggested vendors or approved equal:

1. Vanbro Co.
   1900 South Avenue
   Staten Island, NY 10314
   PH 718-761-3164

2. Scara-Mix Inc.
   2940 Richmond Terrace
   Staten Island, NY
   PH 718-447-1755

3. Diamond Ready Mix
   200 Bloomfield Avenue
   Staten Island, NY
   PH 718-494-1600

C. STEEL-FACED CURBING – suggested vendors or approved equal:

1. Eastern Steel Corp.
   1946 Pitkin Avenue
   Brooklyn, NY 11207
   PH 718-495-5300

2. GCM Steel Products Inc.
   454 Troutman Street
   Brooklyn, NY 11237
   PH 718-386-7373

3. Bend-All Industries Inc.
   4459 Bronx Boulevard

Bronx, NY 10470

PH 718-325-1588

3.3 FIELD QUALITY CONTROL

A. The Contractor shall not commence site disturbance work until:

1. Builder's Pavement Plan has been approved by the DOB/DOT.

2. All required permits have been obtained.

B. Use adequate numbers of skilled workmen 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. The Contractor is responsible for co-coordinating all the surveying work (stake-out, line and grade, etc.) that is necessary for the work.

D. All designs, materials, construction methods and workmanship shall comply with the following publications of the bureau of highways: standard specifications, standard details of construction rules of bureau of highways operations: guidelines for the design of infrastructure components.

E. All non standard materials and construction procedures shall be specifically approved in writing by the DOT.

F. Any work not complying with the requirements of the DOT shall be removed and replaced.

G. All sidewalk and street areas constructed under the builder's pavement plan shall remain open to the public at all times.

H. A construction plan showing maintenance and protection of traffic, including placement of barriers and signage, shall be submitted to the borough highway office before construction begins.

I. Permits shall be presented from all public agencies and utilities sharing ownership of structures relocated or removed during construction.

J. All pavement markings including thermoplastic lane divide, removed during construction shall be replaced in kind to the bureau of traffic standards.

K. The Contractor shall be responsible to retain an independent certified laboratory for testing of any roadway pavement cores and sidewalk concrete cores (if applicable).

L. The Contractor is to provide manufacturer certification for all types of material used as specified.

M. Placement, removal, and or replacement of curb trees to be done in strict accordance with the New York City Administrative code section 18-107. Maintain seven (7) feet minimum clearance to curb cut.

N. Permits are to be obtained by contractor from the New York City Parks Department prior to any tree planting, replacement and or removal.

O. Installation or relocation of utility poles, hydrants, etc., are to be installed at a minimum clearance or seven (7) feet from a driveway.

3.4 PROTECTION

A. Protect paving from damage due to construction and vehicular traffic until final acceptance.

3.5 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from paving operations.

B. Sweep pavement and wash free of stains, discolorations, dirt, and other foreign material immediately prior to final acceptance.

END OF SECTION

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SECTION 32 12 23

IMPRINTED ASPHALT AND ASPHALT COATINGS

PART 1. - GENERAL

1.1 RELATED DOCUMENTS

A. A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Bases, Ballasts, and Paving – Section 321000.

1.2 DESCRIPTION

A. Coatings for Asphalt are to be specifically formulated for application to asphalt pavement and are to have been confirmed by a certified testing facility to possess a balance of performance properties for a durable and color-fast finish.
B. Color as scheduled by Commissioner
C. Coatings to have an SRI greater than 29 and therefore can help projects qualify for points in the LEED program under Heat Island Effect.

1.3 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

    a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
    b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
    c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially

manufactured within a 500 mile radius, the percentage (by weight) that complies.

d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).

e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Samples

1. Submit 12" x 12" color samples for each color specified.

1.4 REFERENCES

A. The City of New York, Department of Transportation, Bureau of Highways, Roadway Division, Standard Details of Construction manual.

B. ASTM D-4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Tester.

C. ASTM D-4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

D. ASTM D-2697 Standard Test Method for Volume of Nonvolatile Matter in Clear or Pigmented Coatings.

E. ASTM D522-93A Standard Test Method for Mandrel Bend Test of Attached Organic Coatings.

F. ASTM D1653 Standard test method for water vapor transmission or organic film coatings.

G. ASTM G-155 Standard Practice for Operating Xenon Arc Apparatus for UV Exposure of Nonmetallic Materials.

H. ASTM D 2369 Weight Solids Standard test method for Volatile Content of Coatings.

I. ASTM D 1475 Standard Test method for Density of Paint, Varnish, Lacquer, Other related products.

J. ASTM D-2240 (2000) Standard Test Method for Rubber property – Durometer hardness.

K. ASTM D-5895 Standard Test Method of drying or curing during film formation of organic coatings using mechanical recorders.
L. ASTM D-570 Standard Test Method for water absorption of plastics.
M. ASTM E303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary. The contractor shall not accept delivery of any damaged materials to the site. Damaged materials shall not be used. The inspector shall have final say over any materials in question.

PART 2. – PRODUCTS

2.1 MATERIALS

A. Non-Textured Asphalt Pavement Coating: epoxy modified, acrylic, waterborne coating specifically designed for application on asphalt pavements that retains its properties in both dry and wet environments.
1. StreetBondSR StreetBond 150 Colorant by Quest Construction Products or Commissioner approved equal by PolyCon USA, Toda America or Euclid Chemical.

B. Solar Reflective Colorant: highly concentrated, high quality, UV stable pigment blend, containing additives that enhance the solar reflective characteristics to achieve relevant LEED criteria. Colorant must be suitable for use over non-textured asphalt pavement coating. Provide colors to match Basis of Design colors noted in the Finish Schedule on the drawings.
1. StreetBond SR Colorant by Quest Construction Products or Commissioner approved equal by PolyCon USA, Toda America or Euclid Chemical.

2.2 PROPERTIES
The following tables outline the physical and performance properties of the coatings.

TABLE 1: TYPICAL PHYSICAL PROPERTIES OF COATING

Solids by Volume	ASTM D-2697	55%
Solids by Weight	ASTM D-2369	68.9%
Density	ASTM D-1475	13.34 lbs/gal (1.599 kg/l)

TABLE 2: TYPICAL PERFORMANCE PROPERTIES OF COATING

Dry time (To re-coat)	ASTM D-5895 23°C, 37% RH	35 min	
Taber Wear Abrasion Dry H-10 wheel	ASTM D-4060 7 days cure	0.98 g/1000 cycles	
Taber Wear Abrasion Wet H-10 wheel	ASTM D-4060 7 days cure	3.4 g/1000 cycles	
QUV E Accel. Weathering environment.	ASTM G-155 2,000 hours (CIE units)	ΔE = 0.49 (brick color)	
Hydrophobicity Water absorption	ASTM D-570	8.3% (9 days immersion)	
Shore hardness	ASTM D-2240	63 Type D	
Mandrel Bend	ASTM D522-93A	1/4" @ 21° C	
Permeance	ASTM D1653	3.45 g/m²/hr (52 mils)	
VOC	EPA-24 ASTM D3960-05 VOC's	18.7 g/l	
Adhesion to Asphalt	ASTM D-4541	Substrate Failure	
Friction Wet	ASTM E-303 British Pendulum Tester	WP* coated	64
		WP* uncoated	57
		AC** coated	73
		AC** uncoated	60

*WP – test conducted on asphalt in wheel path
**AC – test conducted on asphalt adjacent to curb.

2.3 EQUIPMENT FOR APPLICATION

Provide and use equipment as per manufacturer's installation specifications.

PART 3. - EXECUTION

3.1 INSTALLATION

A. New Asphalt Pavement: asphalt pavement is to be free of defects. A durable and stable asphalt pavement mix design installed according to best practices over a properly prepared and stable substrate is a pre-requisite for all long-lasting asphalt pavement surfaces.

B. Surface Preparation: The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

3.2 APPLICATION OF MATERIALS

A. The Applicator shall use the manufactured specified application equipment.

B. The asphalt pavement surface shall be completely dry and thoroughly cleaned prior to application of the coatings.

C. The coating application shall proceed as soon as practical upon completion of the imprinting of the asphalt pavement where applicable.

D. The first layer of coating shall be spray applied then broomed to work the coating material into the pavement surface. Subsequent applications shall be sprayed then broomed or rolled. Each application of coating material shall be allowed to dry to the touch before applying the next layer.

E. The Applicator shall apply the coatings only when the air temperature is at least 50°F / (10°C) and rising, and will not drop below 50°F / (10°C) within 24 hours. No precipitation should be expected within 24 hours.

3.3 COATING COVERAGE AND THICKNESS

TABLE 4: COATING COVERAGE: NON-TEXTURED SURFACE

	COVERAGE (approx.)	THICKNESS (approx.)			
# OF LAYERS		WET		DRY	
	SF/pail	mm	mils	mm	mils
3	225	0.65	25.7	0.36	14.1
4	175	0.87	34.3	0.48	18.9

3.4 OPENING TO TRAFFIC: minimally, the coating must be 100% dry before traffic is permitted.

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SECTION 321313

CONCRETE WALKS AND CURBS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the concrete walks and curbs as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Concrete curbs and walks.

2. Reinforcement.

3. Joint fillers.

4. Patching of bituminous street paving as required where new construction has occurred.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete - Section 033000.

H. Earthwork - Section 312000.

I. Bases, Ballasts and Paving – Section 321000.

1.4 QUALITY ASSURANCE

A. Concrete used for the Project shall contain 25% recycled content, and as follows; recycled content shall be identified and documented:

1. Concrete: Concrete shall contain flyash as replacement for a minimum of 30 percent (by weight) of the Portland Cement. All design mixes are subject to review and approval by the Structural Engineer.

2. High Albedo Pavement and Walkway Materials: For paving and walkway materials made from concrete. provide finished hardscape with a minimum Solar Reflectance Index (SRI) value of 29. SRI values shall be calculated according to ASTM E 1980. Reflectance shall be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Furnish test reports and materials certification as required in Section 033000.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

PART 2 PRODUCTS

2.1 N.Y.C. SIDEWALKS AND CURBS

A. N.Y.C. sidewalk construction shall comply with all requirements of the New York City Department of Transportation Bureau of Highway Operations Standard Specification, for the following Sections:

1. Section 2.14, 2.15, 2.20, 2.26, 3.05 and 4.13.

2.2 FORMS

A. Provide steel or wood of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

B. Use flexible spring steel forms or laminated boards to form radius bends.

2.3 REINFORCEMENT

A. Provide welded wire mesh conforming to ASTM A 185, 6 x 6, ten (10) gauge.

2.4 CONCRETE

A. Concrete Materials

1. Comply with the applicable requirements of Section 033000.

2. All concrete work of this Section shall contain five (5) percent to seven (7) percent entrained air and shall be air entrained with "Air-Mix" air entraining agent made by Euclid Chemical Company or approved equal made by Master Builders or Grace. Agent shall conform to ASTM C 260 and shall be mixed with concrete in accordance with manufacturer's instructions.

B. Concrete Mix, Design and Testing: Comply with applicable requirements of Section 033000 for concrete mix design, sampling and testing, and quality control, and as herein specified. Design the mix to produce standard-weight concrete consisting of Portland cement, aggregate, air-entraining admixture and water to produce the following properties:

1. Compressive Strength: Four-thousand five hundred (4500) psi, minimum at twenty-eight (28) days, with a water cement ratio not to exceed 0.45 by weight.

2. Slump Range: Two (2) inches to four (4) inches.

3. Air Content: Five (5) percent to seven (7) percent.

2.5 JOINT FILLER

A. Gasket: For joint fillers in concrete work, provide closed cell extruded neoprene gasket conforming to ASTM C 509, Grade 4, black.

B. Sealant: Two (2) part self-leveling polyurethane sealant complying with ASTM C 920, Type M, Class 25, Grade P&NS, equal to Sikaflex-2c NS/SL made by Sika Chemical Co., or approved equal made by Tremco or Pecora. Color of sealant as selected by the Commissioner.

C. Back-up rod for sealant shall be "Ethafoam" made by Dow Chemical Co. or approved equal.

2.6 CURING

A. Cure concrete with "Kurez W VOX" curing compound conforming to ASTM C 309 and Fed. Spec. TT-C-800A, modified with thirty (30) percent solids, as manufactured by the Euclid Chemical Company or equal made by Master Builders, Grace or approved equal.

2.7 WATER REDUCING MIXTURE

A. Provide "Eucon WR-75" water reducing and densifying admixture, as manufactured by Euclid Chemical Company or equal made by Master Builders, Grace, or other approved equal. The admixture shall conform to ASTM C 494, Type A, and not contain any lignosiliconates nor more than one (1) percent chloride ions.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which concrete walks and curbs are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 N.Y.C. SIDEWALKS AND CURBS

A. Installation of N.Y.C. curbs and sidewalks shall conform to Reference Standards noted in Article 2.1 herein.

3.3 SURFACE PREPARATION

A. Remove loose material from the compacted sub-base surface immediately before placing concrete.

B. Proof roll prepared sub-base surface to check for unstable areas and the need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.4 FORM CONSTRUCTION

A. Set forms to the required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of the work and so that forms can remain in place at least twenty-four (24) hours after concrete pavement.

B. Check completed formwork for grade and alignment to the following tolerances:

1. Tops of forms not more than 1/8" in ten (10) feet.

2. Vertical face on longitudinal axis, not more than 1/4" in ten (10) feet.

C. Clean forms after each use and coat with form release agent as often as required to ensure separation from concrete without damage.

3.5 REINFORCEMENT

A. Locate, place, and support reinforcement as specified in Section 0333001.

3.6 CONCRETE PLACEMENT

A. Comply with the requirements of Section 033000 for mixing and placing concrete.

B. Do not place concrete until sub-base and forms have been checked for line and grade. Moisten sub-base if required to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at required finished elevation and alignment.

C. Placing Concrete

1. Place concrete using methods which prevent segregation of the mix. Consolidate concrete along the face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square faced shovels for hand spreading and consolidation.

2. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

D. Curbs: Automatic machine may be used for curb placement. If machine placement is to be used, submit revised mix design and laboratory test results which meet or exceed the minimums herein specified. Machine placement must produce curbs to the required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete.

3.7 JOINTS

A. Provide control joints every 5'-0" unless otherwise indicated.

B. Construct expansion, weakened plane (contraction), and construction joints true to line with face perpendicular to surface of the concrete. Construct transverse joints at right angles to the centerline.

C. Weakened Plane Joints: Provide weakened plane (contraction) joints, sectioning concrete into areas as shown on the Drawings. Construct weakened plane joints for a depth equal to at least 1/4 concrete thickness.

D. Construction Joints: Place construction joints at the end of all pours and at locations where placement operations are stopped for a period of more than 1/2 hour, except where such pours terminate at expansion joints. Use standard metal keyway section forms.

E. Expansion Joints

1. Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.

2. Locate expansion joints at thirty (30) feet o.c. for each pavement lane, unless otherwise indicated.

3. Extend joint fillers full width and depth of joint, and not less than 1/2" or more than one (1) inch below finished surface where joint sealer is required. If no joint sealer required, place top of joint filler 1/8" below finished concrete surface.

4. Furnish joint fillers in one-piece lengths for the fill width being placed wherever possible. Where more than one length is required, adhere joint filler sections together.

5. Protect the top edge of the joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

3.8 CONCRETE FINISHING

A. After consolidating and striking off concrete, level the surface by darbying or bull floating. After the concrete has stiffened sufficiently to permit the operation and the surface sheen has disappeared, the surface shall be floated. Use hand methods only where mechanical floating is not possible. Adjust the floating to compact the surface and produce a uniform texture.

B. After floating, test surface for trueness with a ten (10) foot straight edge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius, unless otherwise indicated. Eliminate any tool marks on concrete surface.

D. After completion of floating and when excess moisture or surface sheen has disappeared, complete surface finishing by drawing a fine hair broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to the Commissioner.

E. Do not remove forms for twenty-four (24) hours after concrete has been placed. After form removal, clean ends of joints and point up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by the Commissioner.

3.9 CURING

A. Protect and cure finished concrete paving, complying with applicable requirements of Section 033000. Use curing compound specified herein applied in accordance with manufacturer's instructions.

3.10 REPAIRS AND PROTECTION

A. Repairs: Where pavement has been cracked or damaged, remove the entire panel wherein the damage occurs and install a new panel of pavement. No patching within a panel is permitted.

B. Protection

1. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least fourteen (14) days after placement. No construction traffic is permitted.

2. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

C. Bituminous street pavement cut and/or damaged due to new construction shall be patched and repaired to match existing pavement; work shall conform to N.Y.C. Dept. of Transportation Standard Specifications, Section 4.01 and 4.02.

END OF SECTION

SECTION 321413

PRECAST CONCRETE PAVERS

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the unit pavers as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Precast concrete pavers.

2. Mortar setting bed.

3. Bituminous setting bed.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete slab - Section 033000.

1.4 QUALITY ASSURANCE

A. Qualifications of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for

review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Manufacturer's Data: Submit copies of manufacturer's specifications and installation instructions for pavers required. Include data substantiating that materials comply with specified requirements. Indicate that installer has received copy of manufacturer's instructions.

C. Samples: Submit three sets of 1' x 1' samples of each type and each finish of precast paver. Indicate in each set the full range of exposed color and texture to be expected in the completed work. Commissioner's review will be for color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

1.6 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect pavers during storage and construction against moisture, soiling, staining, and physical damage.

B. Handle pavers to prevent chipping, breakage, soiling, or other damage. Do not use pinch or wrecking bars without protecting edges of pavers with wood or other rigid materials. Lift with wide-belt type slings wherever possible; do not use wire rope or ropes containing tar or other substances which might cause staining. If required, use wood rollers and provide cushion at end of wood slides.

C. Store pavers on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and pavers to distribute weight evenly and to prevent breakage or cracking of pavers. Protect stored pavers from weather with waterproof, non-staining covers or enclosures, but allow air to circulate around units.

1.8 WARRANTY

A. Provide manufacturer's standard one-year warranty agreeing to replace any pavers that should prove defective within a period of one-year from date of delivery to the site.

PART 2 PRODUCTS

2.1 UNIT PAVERS

A. Precast Concrete Pavers: Nominal 24" x 12" x 3" thick interlocking precast concrete pavers, minimum 4000 psi air entrained concrete, stone aggregate conforming to ASTM C 936. Pavers shall weigh not less than 25 lbs./lin. ft. Pavers shall be manufactured by Hanover, Wausau, Stepstone, or approved equal to match color and blend of approved sample. Basis of design is Hanover Prest Pavers with Tudor Finish, color as scheduled.

2.2 MATERIALS FOR MORTAR SETTING BED

A. Materials for installing and grouting concrete pavers shall be Portland cement/sand mortar gauged with Latex Setting Liquid and Latex Admixture as manufactured by Laticrete International, Inc., Boiardi, or approved equal.

1. Portland Cement: ASTM C 150, Type 1; white.

2. Aggregate for Cement Setting Beds: Sand as recommended in ASTM C 398, uniformly graded from coarse to fine, with 100% passing the No. 4 sieve and not more than 5% passing the No. 100 sieve.

3. Aggregate for Grout: Sand as recommended in ASTM C 398, uniformly graded from coarse to fine with not more than 5% passing the No. 100 sieve; 100% may pass the No. 30 sieve, but if the work requires a coarser sand, the coarse sieve size limit may be increased to the No. 16 size. Color as required to obtain selected grout color.

4. Pigments: Commercial iron oxide, manganese dioxide, ultramarine blue, chromium oxide, or carbon black, suitable compounded for use in mortar mixes. Do not exceed pigment-to-cement ratios, by weight of 1-to-35 for carbon black and 1-to-7 for other pigments.

5. Latex Additives: As manufactured by Laticrete International or Boiardi, provide Laticrete 4237 or Boiardi 753 Setting Liquid and Laticrete 3701 or Boiardi 150 grout and mortar admixture. Installation shall be in strict accordance with manufacturer's instructions.

6. Water: Potable, clear and free of deleterious materials which would impair the quality of the mortar.

B. Reinforced mesh where required shall be 2" x 2" x 16 ga. welded galvanized reinforcing mesh.

C. Sealant and related materials shall conform to the following:

1. For joint filler provide closed cell extruded neoprene gasket conforming to ASTM C 509, grade 4, black.

2. For sealant, provide a 2-part polyurethane sealant complying with Fed. Spec. TT-S-00227, Class B, Type 2, equal to "HPL" made by Tremco, or approved equal made by Mameco or Pecora. Color of sealant as selected by the Commissioner.

3. Back-up rod shall be "Ethafoam" or approved equal.

4. Prime joints using primer recommended by sealant manufacturer.

2.3 JOINT TREATMENT

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement, unfading mineral pigments, and white or colored sand as required to produce required color.

1. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed sand-portland cement grout.

2.4 MATERIALS FOR BITUMINOUS SETTING BED

A. Primer for Base: ASTM D 2028, cutback asphalt, grade as recommended by unit paver manufacturer.

B. Fine Aggregate for Setting Bed: Clean, hard sand with durable particles and free from adherent coatings, lumps of clay, alkali salts and organic matters. Aggregate shall be uniformly graded from "coarse" to "fine" and all passing the No. 4 sieve and meet with gradation requirements when tested in accordance with the standard method of test for sieve and screen analysis for fine and coarse aggregates ASTM C 136-67. The dried fine aggregates shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees F. at asphalt plant. The appropriate proportion of materials shall be seven (7) percent asphalt cement and ninety-three (93) percent sand by weight in the approximate ratio of 145 pounds asphalt to 1,855 pounds of sand. The contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

C. Asphalt Cement: ASTM D 946-69A with a penetration at 77 degrees F. 100G., 5 sec of minimum 85 millimeters and a maximum of 100 millimeters.

D. Neoprene Modified Asphalt Adhesive: Shall consist of two (2) percent neoprene (Grade WM1) oxidized asphalt with a one-hundred-fifty-five (155) degree softening point (80 penetration) and ten (10) percent asbestos free fibers.

E. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.

1. Provide sand of color needed to produce required joint color.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which pre-cast concrete pavers are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION TOLERANCES

A. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes, and alignment shown.

1. 1/16" in 10'-0" run, any direction; +/- 1/16" at any location; 1/32" offset at any location.

3.3 INSTALLATION, GENERAL

A. Do not use pavers with chips, cracks, voids, discolorations, and other defects which might be visible or cause straining in the finished work.

B. Cut pavers with motor driven saw equipment designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible.

C. Set pavers in the patterns shown with uniform hand tight joints.

D. Tolerances: Maintain surface plane for finished floors not exceeding a tolerance of 1/8" in ten (10) feet when tested with a ten (10) foot straightedge.

3.4 INSTALLATION, MORTAR SETTING BED

A. Application

1. Preparation of Subbase: Clean concrete subbase to remove dirt, dust, debris, film or curing compound, and loose particles. Saturate concrete subbase with clean water several hours before placing setting bed. About one hour prior to placing setting bed, remove surface water.

2. Mortar bed shall consist of the following

a. Slurry Bond Coat
   1). 1 bag Portland Cement
   2). 100 lb. Sand (30-60 mesh)
   3). 5 gal. Latex Setting Liquid (adjust quantity to proper consistency)

b. Joint Grout Mix
   1). 1 bag Portland Cement
   2). 3 cu. ft. Coarse Sand (ASTM C33)
   3). 3 gal. Latex Admix (adjust quantity to proper consistency).

B. Setting

1. The prepared mortar shall be spread to the desired thickness. The mortar shall be rodded and compacted with a steel trowel.

2. Before placing the stone on a green or wet screed bed, a slurry coat shall be applied to the mortar bed using a flat trowel. Thickness of the bond coat shall be approximately 1/16". In addition, a skim coat shall be applied to the back of each stone, just prior to placing on the bed.

3. Stone shall be placed in the wet slurry coat before the surface dries. Uniform joints shall be maintained with a nominal width of 1/4".

4. After each piece is laid, it shall be beat in with a wooden block or rubber mallet to level the surface and embed the stone. Bearing shall be done before mortar takes initial set.

C. Mortar Joints: Joints are 1/4" wide typically. After all stone units have been set and setting bed is thoroughly cured, brush all 1/4" wide joints clean. Thoroughly wet raked out portion of joints and then fill solid with joint mortar of approved color to match stone. Mortar shall be placed relatively dry and tooled in layers. Finished profile shall be slightly recessed. Grouting of joints as done in tile work is not permitted. Every effort must be made to keep mortar off stone face including applying masking tape to prevent staining of adjacent stone surfaces in continuous strips in alignment with joint edge. Remove tape immediately upon grout having achieved its finish set.

D. Joint Treatment for Joints to Receive Sealant

1. All exterior control joints as noted on the drawings and all joints in base work shall receive back-up fillers and sealant as specified herein.

2. General: Install all sealant in strict accordance with manufacturer's recommendations as approved by the Commissioner.

   a. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Guns shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool all joints to provide the contour as indicated on the drawings.
   b. For application of sealant when air temperature is below 40 deg. F., consult sealant manufacturer for recommendations.

3. Preparation: Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied paint or film must be entirely removed.

4. Application

   a. Install back-up material and joint filler, of type and size specified, using a blunt instrument so as not to puncture the surface skin, at proper depth in joint to provide sealant dimensions as detailed. Provide back-up material of

suitable size and shape so that, when compressed (25 to 50%) it will fit in joints as required. Sealant shall not be applied without back-up materials, and, if necessary, bond breaker strip. When using back-up of rod stock, roll the material into the joint to avoid lengthwise stretching. Rod stock shall not be twisted or braided.

b. Apply masking tape, where required, to prevent staining of adjacent stone surfaces, in continuous strips in alignment with joint edge. Remove tape immediately after joints have been sealed and tooled as directed.
c. Prime surfaces of all stone to receive sealant.
d. Apply, tool and finish sealant as required. When tooling light colored sealants, use dry tool or tooling solution recommended by sealant manufacturer.
e. Clean adjacent surfaces free of sealant or soiling resulting from this work as work progresses. Use solvent or cleaning agent as recommended by sealant manufacturer. All finished work shall be left in a neat, clean condition.
f. Sealants shall be applied in such a manner as to completely fill the joint.
g. All sealants shall be tooled to insure complete filling of the joint to eliminate air pockets and voids and to insure positive adhesion of the sealant with the bonding surfaces.
h. All joints shall be neatly finished.

3.5 INSTALLATION, BITUMINOUS SETTING BED

A. Application

1. Over concrete sub-slab install the bituminous setting bed, place 3/4" deep control bars directly over the base. If grades must be adjusted, set wood chocks under depth control bars to proper grade. Set two bars parallel to each other approximately eleven (11) feet apart to serve as guides for striking board. The depth control bars must be set carefully to bring the pavers, when laid, to proper grade.

2. Place bituminous bed between the parallel depth control bars. Pull this bed with the striking board over these bars several times. After each passage, low porous spots must be showered with fresh bituminous material to produce smooth, firm and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. Carefully fill up any depressions that remain after removing the depth control bars and wood chocks.

3. The setting bed shall be rolled while hot with a power roller to a nominal depth of 3/4".

4. The elevation shall be adjusted so that when the pavers are placed, the top surface of the pavers will be at the required finished grade.

5. A coating of two (2) percent neoprene modified asphalt adhesive shall be applied by mopping or squeegeeing or troweling over the top surface of the bituminous

setting bed so as to provide a bond under the pavers. If it is troweled, the trowel shall be serrated with serrations not to exceed 1/16".

6. When the modified asphalt adhesive is dry to the touch, carefully place the pavers by hand in straight courses with hand tight joints and uniform top surface. Good alignment must be kept, and the pattern shall be that shown on the plans.

7. Newly laid pavers must be protected at all times by panels of plywood on which the installer stands. These panels can be advanced as work progresses. However, the plywood protection must be kept in areas which will be subjected to continued movement of materials and equipment. These precautions must be taken in order to avoid depressions and protect paver alignment. If additional leveling of the pavers is required, and before sweeping in joint filler, roll with a power roller after sufficient heat has built up in the surface from several days of hot weather.

8. Provide hand tight joints (shall read from 0" to maximum 1/8"). Sweep a dry mixture of one (1) part colored Portland cement to match color of pavers and three (3) parts sand until joints are completely filled. Fog lightly with water. Cement stains that remain shall be cleaned with a ten (10) percent solution of muriatic acid or mortar cleaner.

B. Control and Expansion: Control and expansion joints shall be installed where pavers abut restraining surfaces such as walls, curbs, columns, etc., and directly over any joints in the structural slab and other areas noted on Drawings. Joints shall be filled in accordance with specifications.

3.6 REPAIR AND CLEANING (AFTER INSTALLATION)

A. Remove and replace paver units which are broken, chipped, stained, or otherwise damaged. Patching or hiding defects in pavers will not be permitted. Provide new matching units, install as specified herein to eliminate evidence of replacement.

3.7 PROTECTION

A. After installation and cleaning, protect pavers from damage during subsequent construction activities.

B. Protect all pavers from other materials that will cause stain. Pavers subject to damage after setting shall be properly covered or protected.

C. At completion of construction work, remove all temporary protection from the work of this Section.

D. Examine all work and repair all damage. Clean soiled or stained surfaces. In the event damage is irreparable, or soiled or stained surface cannot be cleaned, remove and replace such items at no additional cost to the City of New York.

END OF SECTION

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SECTION 323119

ORNAMENTAL FENCING

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. General Requirements, LEED BUILDING: The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work proposed by the Contractor or his Subcontractors shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

1.2 SECTION INCLUDES

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the ornamental fencing as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Ornamental steel fencing as indicated on drawings, consisting of tubular frame with decorative infill.

2. Hardware and accessories.

1.3 RELATED SECTIONS

A. LEED Submittals - Section 013329.

B. Construction Waste Management - Section 017419.

C. LEED Requirements - Section 018113.

D. Environmental Practices - Section 018116.

E. Construction IAQ Management - Section 018119.

F. VOC Limits for Adhesives, Sealants, Paints and Architectural Coatings - Section 018419.

G. Concrete work - Section 033000.

H. Concrete walks and curbs - Section 321313.

1.4 QUALITY ASSURANCE

A. Provide ornamental fencing as complete units controlled by a single source including necessary erection accessories, fittings, and fastenings.

1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: Any substitution must also comply with the LEED requirements listed for the specified item.

The contractor and their subcontractors shall submit the LEED Building certification items in accordance with Section 013329: Sustainable Design Requirements. LEED Building submittals shall include the following, as applicable:

1. A completed GREEN BUILDING MATERIALS REPORTING FORM. Information to be provided for this form shall include:

   a. Cost breakdowns for the materials included in the contractor's or subcontractor's work. Cost breakdowns must include total installed cost and material-only cost (excluding labor and equipment).
   b. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if any.
   c. Indication of whether the extraction, harvesting, or recovery as well as manufacturing location for the supplied product(s) is within 500 miles of the project site. If the product is only partially manufactured within a 500 mile radius, the percentage (by weight) that complies.
   d. For field applied interior adhesives, sealants, coatings and paints, provide the VOC content in grams/Liter (g/L).
   e. Identification of engineered wood, composite wood, agrifiber products and the use of laminating adhesives with added urea-formaldehyde resins, if applicable.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the GREEN BUILDING MATERIALS REPORTING FORM.

3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) content of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

4. The LEED Building Submittal information shall be assembled into one package per Specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Commissioner's rejection of products or assemblies.

B. Product Data: Submit manufacturer's technical data and installation instructions for ornamental fencing.

C. Provide shop drawings for each type of fencing, including attachment to adjacent construction.

1.6 PRODUCT HANDLING

A. Protection: Use all means necessary to protect fencing materials before, during, and after installation to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacement necessary to the acceptance of the Commissioner and at no additional cost to the City of New York.

1.7 SAMPLES

A. Provide manufacturer's literature indicating characteristics of each portion of work.

B. Submit 10" x 10" fencing sample.

C. Submit 6" sample of each component of fencing.

1.8 PERFORMANCE CHARACTERISTICS

A. Polyester Powder Coating

1. Salt Spray Resistance: When tested in accordance with ASTM B 117, Bonderite 1000 steel panels, in a scored condition, exhibit no undercutting after 500 hours in 5 percent salt spray testing at 95 degrees F and 95 percent relative humidity. No rusting or blistering on panel face. Under the same conditions after 1000 hours, the panels showed less than 3/16" undercutting.

2. Weatherability: When tested in accordance with ASTM D 822, with one-year exposure in South Florida, with panels facing south and tilted at a 45 degree angle, a high gloss white polyester coating retains 88 percent of its gloss (gloss reading obtained on washed panels). No film failure.

1.9 LEED PERFORMANCE CRITERIA

A. Field applied adhesives or sealants used for work in this section shall meet the requirements of Section 018419, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the LEED Building Submittal Requirements.

B. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard, laminate flooring) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the LEED submittal requirements of Section 013329.

C. Products harvested, extracted, recovered, as well as manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED Building Submittal Requirements of this Section.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Products specified herein are components of the "Orsogril" as produced by Orsogril Group or equivalent product of Ametco Manufacturing Corp., Barnett Bates Corp., Metalco, or approved equal.

2.2 MATERIALS AND FABRICATION

A. Fabrication: Fence panel components shall be manufactured using the electro-forged welding process for complete penetration of cross members.

B. Configuration: Fence panels and support components shall be fabricated to the configurations of Orsogril's "Pleione" (basis of design).

C. Steel Bar Stock: ASTM A 36.

D. Steel Tubing: ASTM A 500, Grade B.

2.3 FENCE PANELS - CONSTRUCTION

A. Electro-Forge Welded Steel Fencing: Orsogril Pleione Design - 1" x 1/8" main (vertical) bar, 3/16" round cross (horizontal) bar, 2-7/16" x 2-5/8" mesh. Galvanized to ASTM A 123 and powder polyester coated (2.56 lbs. per sq. ft.).

1. Manufacturing Technique: Typical fencing configuration in steel grating produced by an automatic electrofusion process.

2.4 GATES

A. Fabrication: Fabricate perimeter frames of gates from steel tubing. Finish to match fence panels. Assemble gate frames by welding at corners.

1. Infill gate frames with panels as selected by the Commissioner (basis of design is Orsogril Pleione by Orsogril Group).

B. Swing Gate Hardware: Provide hardware and accessories, galvanized and shop finished to match adjacent gate components.

1. Hinges: Size and type to be determined by fencing manufacturer. Provide three hinges for each leaf.

2. Bolt: Mechanical release one side, keyed opposite side (outside).

2.5 MISCELLANEOUS ACCESSORIES

A. Anchors: Anchors fabricated from corrosion resistant materials with capability to sustain, without failure, a load equal to 4 times the load imposed when installed in concrete footings as determined by testing per ASTM E 488.

1. Cast-in-place anchors.

B. Non-Shrink, Non-Metallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for exterior applications.

C. Include all required supporting, posts and rails.

2.6 FINISHING

A. Galvanizing: Fence construction shall be hot-dip galvanized in accordance with ASTM A 123.

B. Color Coating: After galvanizing or cadmium plating, components shall be shop coated with polyester powder coating, or in the case of over-size components, shop coated with Sherwin Williams "Polane" two-part polyurethane shop coating. Custom color as selected by Commissioner.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where ornamental fencing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

A. General: Install ornamental fences in accordance with manufacturer's instructions and approved shop drawings.

B. Posts: Install fence posts plumb and level by setting post in hole cast or drilled in concrete and grouting solid. Temporarily brace fence posts with 2 by 4 wood supports until grout is set.

1. Center and align posts in concrete substrates.

2. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

C. Fence Panels: Secure fence panels to posts with stainless steel anti-intruder bolts in accordance with manufacturer's instructions.

D. Gates: Install gates plumb, level, and secure for full opening without interference. Adjust hardware for smooth operation and lubricate where necessary.

1. After installation, test gate and hardware. Open and close a minimum of 5 times. Correct deficiencies and readjust.

E. Touch-up any finish damaged during installation with paint supplied by manufacturer and matching original coating.

END OF SECTION

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SECTION 323132

SLIDING GATE OPERATORS

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.

1.2 WORK INCLUDED

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the sliding gate operators as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Pre-wired, sliding gate operator, complete with all microprocessor, hardware, mechanical and electrical devices to move gate and limit its travel.

1.3 RELATED WORK

A. Electrical service - Division 26.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical information for gate operator and accessories, including standard details and installation and maintenance instructions.

B. Shop Drawings: Prepare and submit detailed drawings for gate operator and accessories. Include plans, elevations, and details of typical members and other components. Show layout and installation details, including anchorage details.

C. Wiring diagrams detailing wiring for gate operator, signal, and control systems differentiating clearly between manufacturer installed wiring and field-installed wiring.

1. Show the locations of connections to electrical service.

2. Provide interface connection diagrams for manual control stations.

D. Maintenance Instructions: Provide the manufacturer's instructions for maintenance of gate operator and accessories.

1. Include recommended methods and frequency for maintaining equipment in optimum operating condition under anticipated traffic and use conditions.

2. Include precautions against materials and methods that may be detrimental to finishes and performance.

3. Provide text description of sequence of operations.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is an authorized representative of the gate operator manufacturer for both installation and maintenance of the type of units required for this project, and whose installations have resulted in construction with a record of successful in-service performance.

B. UL and NEMA Compliance: Provide internal electrical components required as part of gate operator and accessories that are listed and labeled by UL and comply with applicable NEMA standards.

1. Operator shall be built to UL 325 and UL 991 standards and be listed by a ETL testing laboratory. Complete all electrical work according to local codes and National Electrical Code.

2. Operator shall be compliant in usage Classes I and II.

C. Single-Source Responsibility: Obtain gate operator and accessories from one source from a single manufacturer.

D. Design Concept: The drawings indicate the size, profiles and dimensional requirements of gate operator components and are based on the specific type and model indicated. Individual components by other manufacturers may be considered provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Commissioner. The burden of proof of equality is on the proposer.

1.6 WARRANTY

A. Provide a 5-year warranty against all defects in materials or workmanship. Defective materials shall be replaced with comparable materials furnished by the manufacturer, at no cost to the City of New York.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis for Project Design: 9100 Series vehicular slide gate operator system as manufactured by DoorKing, Inc. or equivalent product of Liftmaster, Viking Access, or an approved equal.

2.2 SYSTEM DESCRIPTION

A. Slide Gate Operator

1. The slide gate operator shall use a microprocessor based solid-state control board that controls all functions of the slide gate operator. Operator shall be rated for continuous duty for use in residential and commercial applications.

2. Primary reduction system shall employ an adjustable clutch and power transfer shall be provided by single cog belt drive train.

3. Operator shall employ magnetic sensing to set open and close limit adjustment. Mechanical type limit switches shall not be allowed.

4. Operator shall automatically set both open and close limit adjustments upon power-up and activation in the open direction. Operator shall automatically sense for any gate coasting to insure true limit settings.

5. Pulling medium shall provide a positive mechanical connection to the gate system. Friction driven rail type pulling mediums shall not be allowed. Roller chain pulling medium shall be minimum size #41.

6. A positive dead bolt shall activate only when the gate is forced open, to reduce solenoid lock wear and failure.

7. Operator shall be capable of being mounted at the front, center or rear of the gate system, shall be designed for either left or right hand mount and shall be designed for pad or post mounting.

8. Operator frame shall use 12-gauge G90 galvanized steel to avoid rusting and shall be painted charcoal gray.

9. Operator shall have two 115 VAC convenience outlets available for accessory transformer power and shall have a built-in lockable power disconnect and reset switch.

B. Control Circuit

1. Control board shall have connections for optional Gate Tracker board. Gate tracker shall record operator cycles (x100), input errors, loop detector errors, obstruction hits, and power up events. Record shall be time and date stamped.

2. Control board shall allow a stop or a stop and reverse function (settable) from a safety related input.

3. Control board shall have two ports for plug in of vehicular loop detectors, (DoorKing, Models 9409 or 9410).

4. A dry set of relay contacts shall be available for external use, and shall have four programmable functions.

5. A special input shall allow the gate to be partially opened.

6. A timer override function shall cause an opening gate to stop and then reverse direction when the reverse loop(s) or reverse input is clear even if the gate has not reached the full open position, to help reduce tailgating.

7. Control board shall have separate inputs for external contact and non-contact entrapment protection devices.

8. Functions will be user programmable by DIP-switches located on the control board.

C. Fail-Safe Operation: To prioritize safety over security, operator shall assume a fail-safe mode in the event of a power loss or if an entrapment is sensed (entrapment alarm activated).

1. Operator shall revert to a fail-safe mode allowing the gate to be pushed open without any special knowledge or use of any special cranks, keys or other devices.

D. Primary Electronic Reverse

1. The vehicular gate operator shall be equipped with an inherent electronic obstruction sensing system. The electronic sensing system shall automatically cause the gate operator to stop and reverse if an obstruction is sensed during the open or close cycle.

2. For enhanced safety, the control circuit shall check the obstruction sensing system circuit prior to the start of each cycle of operation. Should the control circuit detect a fault in the obstruction sensing system, the motor shall not be allowed to start.

E. Secondary Entrapment Prevention

1. Non-contact sensors, or contact sensors, or combination thereof, shall be utilized to prevent persons from becoming entrapped in the gate system.

2. Warning signs shall be installed in accordance with manufacturer's installation instructions and UL 325 guidelines.

F. A complete operational system shall be provided.

2.3 EQUIPMENT

A. Model 9100 Vehicular Slide Gate Operator

1. Single cog belt drive train with adjustable clutch.

2. Automatic limit/ coast magnetic adjustment system.

3. Solid-state control circuit and motor control.

4. Partial open limit feature.

5. UL Class of Operation: I, II, III and IV.

6. #41 roller chain.

7. 1/2 HP, 115 VAC, 5.4 Amp (typical).

8. 30-ft maximum gate length, approximately 1-ft/sec. 1000 lb maximum gate weight.

9. Dimensions: 24 inches high, 12 inches wide, 11.5 inches deep.

B. Secondary Entrapment Prevention

1. 1. Non-contact sensors (photo-cells).

    a. P/N 8080-010 Infrared thru-beam, 165 foot sensing distance.
    b. P/N 8080-011 Photo-reflective beam, 30 foot sensing distance.
    c. P/N 8080-030 Polarized photo-reflective beam, 35 foot sensing distance.
    d. P/N 8080-031 Infrared thru-beam 65 foot sensing distance.

2. 2. Contact sensors

    a. P/N 8080-015 Single-sided sensitivity with mounting channel.
    b. P/N 8080-020 Three-sided sensitivity with mounting channel.
    c. P/N 8080-021 Sensor designed to mount on 2 inch round post.
    d. P/N 8080-022 Sensor designed to mount on 2 inch square post.

C. Options (provide options as directed by the Commissioner)

1. Vehicle Loop Detectors

    a. P/N 9410-010 Single channel detector.
    b. P/N 9409-010 Two channel detector.

2. Chain tray kit (P/N 2601-270) available in 10-ft sections.

3. Red/Green traffic signal (P/N 1603-208).

4. Environmental Control: P/N 1601-154 Heater kit.

5. Drive Chain

    a. P/N 2600-443 Nickel plated drive chain, #41.
    b. P/N 2600-475 Stainless Steel drive chain, #41.

6. Post Mount Base Plate: P/N 2600-418. Use to post mount the 9100 operator (mounting post are not included).

7. Gate Tracker: The vehicular slide gate operator shall have output for connection to Gate Tracker control board (P/N 2351-010). Gate Tracker shall maintain a detailed electronic record of cycles, input errors, loop detector errors, obstruction hits, and each time power is applied to the operator, time and date stamped.

D. A complete operational system shall be provided.

2.4 FACTORY TESTING

A. Fully assemble and test gate operator, at the factory, to ensure smooth operation, sequencing and electrical connection integrity. Apply physical loads to the operator to simulate field conditions. Tests shall simulate physical and electrical loads equal to the fully rated capacity of the operator components.

B. Check all mechanical connections for tightness and alignment. Check all welds for completeness and continuity. Check welded corners and edges to assure they are square and straight.

C. Inspect painted finish for completeness and gloss. Touch up imperfections prior to shipment.

D. Check all electrical wires to assure that chafing cannot occur during shipping or operation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Prior to beginning equipment installation, examine areas to receive gate operator and accessories. Verify that critical dimensions are correct and that conditions are acceptable.

1. Do not proceed with installation of gate operator and accessories until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide templates for anchor bolts and other items encased in concrete or below finished surfaces in sufficient time so as not to delay the Work.

B. Provide cut-outs to accept conduit work associated with other trades.

3.3 INSTALLATION

A. General: Install gate operator and accessories in accordance with the manufacturer's instructions and placement drawings.

1. Coordinate placement of anchors and accessories encased in concrete with Division 3.

3.4 FIELD QUALITY CONTROL

A. Test gate operator through 10 full cycles and adjust for operation without binding, scraping or uneven motion. Test limit switches for proper functioning.

B. All anchor bolts shall be fully concealed in the finished installation.

3.5 DEMONSTRATION

A. Instruct the City of New York's personnel in the proper operation and maintenance of the gate operator and accessories. Train the personnel in procedures to follow in the event of operational failures or malfunctions.

3.6 CLEANING

A. After installation clean finished surfaces. Touch up damaged shop-applied finishes as required to restore damaged areas.

END OF SECTION

SECTION 329200

TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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. This Section includes the following:
1. Meadow/No Mo Seeding

B. Related Sections include the following:
1. Division 31 Section "Earthwork" for excavation, filling and backfilling, and rough grading.
2. Division 32 Section "Plants."

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
1. Certification of each seed mixture, identifying source, including name and telephone number of supplier.

C. Product Certificates: For soil amendments and fertilizers, signed by product manufacturer.

D. Qualification Data: For landscape Installer.

E. Material Test Reports: For existing surface soil and imported topsoil.

F. Planting Schedule: Indicating anticipated planting dates for each type of planting.

G. Maintenance Instructions: Recommended procedures to be established by the Commissioner for maintenance of lawns and meadows during a calendar year. Submit before expiration of required maintenance periods. See also Article 1.9 of these Specifications.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn and meadow establishment.
   1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

B. Soil-Testing Laboratory Qualifications: An independent 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. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
   1. Report suitability of topsoil for lawn and meadow growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce a satisfactory topsoil.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."

1.7 SCHEDULING

A. 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: not before May 1st nor after June 15th
   2. Fall Planting: no fall planting will be permitted.
   3. Regardless of the dates specified above, planting shall only be performed when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice.
   4. Planting season may be extended only with the written permission of the Commissioner.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.8 MEADOW / No Mo MAINTENANCE

A. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, and throughout the entire 2 year guarantee period.

B. Maintain and establish meadow by watering, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch. In the fall, mow meadow to a height of 6 inches.

C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep meadow uniformly moist.
   1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
   2. Water meadow at a minimum rate of 1/2 inch (13 mm) per week for 12 weeks after planting.

1.9 GUARANTEE

A. Work shall be guaranteed for a period of two (2) years after the date of Acceptance by the Commissioner.

   1. When the work is accepted in parts, the guarantee periods shall extend from each of the partial acceptance to the terminal date of the last guarantee period. Thus, all guarantee periods shall terminate at one time.

B. No Mo lawns with Echinacea shall be healthy, free of pests and disease, and in flourishing condition at the end of the guarantee period.

C. All areas not in a vigorous, thriving condition, as determined by the Commissioner during and at the end of the guarantee period, shall be re-seeded/replanted by the Contractor, without cost to the City of New York, as soon as weather conditions permit and within the specified planting period.
   1. Replacements shall closely match adjacent specimens of the same species and shall be subject to all requirements stated in these Specifications.
   2. The Contractor shall make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the City of New York.
   3. The guarantee of all replacement plants shall extend for an additional one year period from the date of their acceptance after replacement.

1.10 FINAL INSPECTION AND FINAL ACCEPTANCE

A. At the end of the guarantee period, the Commissioner will, upon written request of the Contractor, inspect the work for Final Acceptance. Request shall be received at least ten (10) calendar days before the anticipated date for Final Inspection.

B. Upon completion and re-inspection of all repairs or replacements necessary in the judgement of the Commissioner, the Final Acceptance of the Work of this Section will be given.

PART 2 - PRODUCTS

2.1 MEADOW GRASSES / No Mo Mix

A. Grass Seed: Fresh, clean, dry, new seed, mixed species as follows:

B. Seed shall be grown by one or more of the following nurseries, citing the sources when possible of their material :

   1. Ernst Conservation Seeds
      9006 Mercer Pike
      Meadville, PA

800.873.3321
www.ernstseed.com

1. Prairie Nursery
P.O. Box 306
Westfield WI 53964

800.476.9453
www.prairienursery.com

2. Prairie Moon Nursery
32115 Prairie Lane
Winona, MN 55987

866.417.8156
info@prairiemoon.com

C. Grass seed shall be fresh recleaned seed of the latest crop. Seed mixture shall have the following proportions by weight:

Latin Name	Common Name	%	Unit	Seed / Acre
	No-Mo Cover Mix PDOT-L			100 lb
Festuca rubra	Pennlawn Creeping Red Fescue	35		
Festuca o. var. duriuscula	Defiant Hard Fescue	27.5		
Festuca o. var. duriuscula	Stone Henge Hard Fescue	27.5		
Lolium multiflorum	Annual Ryegrass	10		
SEED TOTAL		100	lb	100 lb

D. Seed shall be purchased from a recognized distributor and shall be composed of the varieties and in the proportions as indicated. Seed shall be pre-mixed by the supplier.

E. Seed shall not contain in excess of 2.5 percent weed seed. Seed containing prohibited or restricted noxious weed will not be accepted, and shall comply with state laws governing noxious weeds.

F. The following noxious weeds are prohibited from any mix: Bindweed, Canada Thistle, quackgrass, hedge kind weed, horse nettle, wild garlic, Bermuda grass, cheat, wild onion, corn cockle, dodder and wild onion, Johnsongrass, perennial sweet sudan grass, sorghum hybrids, mustard.

2.2 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 8 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.
1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
   a. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from agricultural land, bogs or marshes.

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:
   1. Class: Class O, with a minimum 95 percent passing through No. 8 (2.36-mm) sieve and a minimum 55 percent passing through No. 60 (0.25-mm) sieve.
   2. Provide lime in form of dolomitic limestone.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 6 (3.35-mm) sieve and a maximum 10 percent passing through No. 40 (0.425-mm) sieve.

C. Sand: Clean, washed, natural or manufactured, free of toxic materials.

2.4 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 (12.5-mm)] 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: 60 percent of dry weight

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, and material harmful to plant growth.

2.5 PLANTING ACCESSORIES

A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

2.6 FERTILIZER

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 1 percent nitrogen and 10 percent phosphoric acid.

2.7 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Compost Mulch: 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-inch (25-mm) 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: 60 percent of dry weight.

C. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

2.8 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

B. Erosion-Control Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, a minimum of 0.92 lb/sq. yd. (0.5 kg/sq. m), with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

2.9 PLANTING SOIL MIX

A. Planting Soil Mix: Mix topsoil with amendments as necessary to bring existing stripped and stored topsoil to optimal conditions for meadows and grasses according to soil tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
   1. Protect adjacent and adjoining areas from hydroseeding overspray.

B. Provide 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.

3.3 LAWN PREPARATION

A. Limit lawn subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches (150 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off the City of New York's property.
   1. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
      a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
      b. Mix lime with dry soil before mixing fertilizer.
   2. Spread planting soil mix to a depth of 6 inches (150 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
      a. Spread approximately one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil mix.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.

D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

E. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.4 MEADOW / No Mo

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
1. Do not use wet seed or seed that is moldy or otherwise damaged.

B. Sow seed at the rates specified by the supplier.

C. Brush seed into top 1/16 inch (1.6 mm) of topsoil, roll lightly, and water with fine spray.

D. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak and scatter uniformly to a depth of 3/16 inch (4.8 mm) and roll to a smooth surface.

E. Water newly planted areas and keep moist until meadow is established.

3.5 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.

C. Remove erosion-control measures after grass establishment period.

END OF SECTION 02920

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SECTION 329300

PLANTS

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.

1.2 SUMMARY

A. Related Sections include the following:
1. Division 31 Section "Earthwork".
2. Division 32 Section "Turfs and Grasses".

1.3 WORK INCLUDED

A. Work of this Section includes all labor, materials, equipment and services necessary to locate, furnish, deliver, install and maintain all landscaping work as shown on the Drawings and as specified herein, including but not limited to the following:

1. Trees, shrubs, perennials
4. Inspection of each site for sub-surface conditions to insure compatibility with specifications for planting
5. Staking
6. Topsoil and soil mix for planting areas
7. Amending topsoil in planted areas, as noted on the plans and in the specifications

1.4 REFERENCES AND STANDARDS

A. American National Standards Institute, Inc. (ANSI): Z60.1 American Standard for Nursery Stock (Sponsor: American Association of Nurserymen, Inc.), latest edition.

B American Society for Testing and Materials (ASTM): C136 Sieve Analysis of Fine and Coarse Aggregates, F405 and F667 Perforated Polyethylene Pipe, D1682 Filter Fabric, latest edition.

C. E11 Wire-Cloth Sieves for Testing Purposes

D. Comply with all rules, regulations, laws and ordinances of the State of New York and all authorities having jurisdiction. 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.

E. Nomenclature: Plant names shall agree with the nomenclature of "Standardized Plant Names" as adopted by the American Joint Committee on Horticultural Nomenclature, Latest Edition. Names of varieties not listed therein shall conform with names generally accepted in the nursery trade. Clonal types must be true. No substitutions will be permitted except by written permission of the Commissioner.

1.5 SPECIAL REQUIREMENTS

A. The following items must be given special attention by the Contractor:

1. The subgrade must be graded smooth, compacted and at the proper elevation as per the Drawings and positively drained before beginning work under this Section.
2. If trees and shrubs are to be planted in the same bed, tree balls shall be placed directly on the compacted subgrade and backfilled to the level of the bottom of the shrub root balls. The sequence of construction will be coordinated to avoid pit excavation wherever possible. It is the intention of this contract to minimize the interface between the subgrade soil and topsoil in order to provide consistent soil textures throughout the project.
3. The layout at paving edges shall be approved in the field by the Commissioner in order to achieve an accurate and consistent placement of the plantings and paving material. To the greatest degree possible, stakes shall be protected during construction.
4. Soil sample analysis shall be made for subgrade material immediately before adding topsoil or planting soil mix. Laboratory analysis shall include physical properties, organic matter content, tests for soluble salts and other toxic elements detrimental to plant growth. If the analysis proves that subgrade materials would be detrimental to plant growth, and if additives cannot correct this situation, then the Commissioner will require the removal of this material to a depth below potential root growth.
5. Sample analyses shall be made for all topsoil and planting and topdressing soil mixes proposed for use on this project. Additives for pH and other properties are often temporary and mixing procedures are often inadequate; therefore, insofar as possible, topsoil and components of planting soil mix shall be obtained which meet specifications without adjustment by additives.
6. Provide protection during installation and maintenance of protective devices for trees in close proximity to construction, as indicated by Civil Engineering.
7. Trees and other plant material which cannot be planted as soon as it arrives on site must be mulched to top of root ball and watered as necessary to maintain the best possible plant health. Bare root plant material shall be stored on site in shade and watered at least every two hours.
8. All planting of all site interior trees and shrubs shall be performed after rain, or when the soil is sufficiently moist as approved by the Commissioner.
9. Water as necessary to maintain plant health.
10. Wash plant material as necessary to prevent dust and other pollutants from building-up on leaves.

1.6 QUALITY ASSURANCE

A. All work under this Section shall be performed by personnel totally familiar with planting work and under supervision of an experienced Landscape Foreman at all times.

B. Selection of Plant Materials:

1. The Contractor shall submit to the Commissioner the name and location of nurseries which he/she proposes to use as sources of acceptable plant material. Please note that all plant materials (trees, shrubs, sod, seed, grasses, etc.) must be grown and sold at nurseries located within a 500 mile radius of the site. The Contractor shall personally inspect all nursery materials to determine that the materials meet the requirements of this Section. Proposed materials shall be tagged at the nurseries by the Contractor prior to viewing by the Commissioner.
2. The Contractor shall schedule with the Commissioner a time for viewing plant material at the nursery. Trips to nurseries shall be efficiently arranged to allow the Commissioner to maximize the viewing time. A minimum of six (6) weeks shall be allowed for this viewing prior to time that plants are to be dug.
3. The Commissioner must attach approved seals to each plant or to representative samples, unless otherwise indicated.
4. Where requested by the Commissioner, photographs of plant material or representative samples of plants shall be submitted.

5. Viewing and/or sealing of plant material by the Commissioner at the nursery does not preclude the Commissioner's right to reject material at the site of planting.
6. All plants shall be subject to tailgate inspection upon arrival. Any plant which fails to meet these specifications shall be rejected.

C. Substitution

1. Before changes or substitutions are made due to unavailability of plant material, the Contractor shall submit satisfactory evidence that he/she has advertised for a one (1) month period in a trade journal such as the "Landscape Materials Information Service", with no response, or has undertaken other methods of locating plant material acceptable to the Commissioner.

1.7 SUBMITTALS

A. The following samples shall be submitted:

1. Shredded hardwood bark mulch: One cubic foot
2. Topsoil: One (1) cubic foot
3. Planting Soil Mix: One (1) cubic foot
   a. Do not combine planting soil mix until approved in writing by the Commissioner.
   b. After planting soil mixing operations have been completed, samples shall be submitted for laboratory analysis. Submit test results to the Commissioner for approval.
4. Leaf Mold: One cubic foot
5. Cedar stake: one (1) complete
6. Tree Gator: one (1) complete
7. Mycor Tree Saver, or approved equal mycorrhizal fungal transplant inoculant

B. Submit certified reports by an approved testing agency indicating compliance with the specifications for topsoil and planting soil and topdressing mixes. Recommendations shall be made by the testing agency as to the type and quantity of soil additives required to bring topsoil and planting soil and topdressing mixes into compliance with the Specifications.

C. Manufacturer's Product Data: Manufacturer's product data shall be submitted for the following materials:
1. Aluminum sulfate
2. Antidesiccant
3. Organic fertilizer
4. Bone meal

D. Certificates: Labels from the manufacturer's container certifying that the product meets the specified requirements shall be submitted for the following materials:
1. Organic fertilizer
2. Bone meal
3. Limestone

E. Submit results of tests by approved testing laboratory for any sand as required to bring either planting soil mix or subgrade material into conformance with the Specifications. Tests shall include mechanical and chemical analysis.

F. Review by the Commissioner of samples of topsoil, mulch, plant material or any other materials at the source of supply, or other samples or certificates prior to delivery shall not constitute final acceptance. The Commissioner reserves the right to reject on or after delivery any topsoil, mulch, plant material, or any other material which does not, in his opinion, meet the

requirements of these Specifications. Any rejected material shall be removed from the site at the Contractor's expense.

1.8 OWNER'S INSPECTION AND TESTING

A. Work will be subject to inspection at all times by the Commissioner. The Commissioner reserves the right to engage an independent testing laboratory to analyze and test materials used in the construction of the work. Where indicated by the Commissioner, the testing laboratory will make material analyses and will report to the Commissioner whether materials conform to the requirements of these Specifications.
   1. Cost of tests and material analyses made by the testing laboratory will be borne by the City of New York when they indicate compliance with the Specifications, and by the Contractor when they indicate non-compliance.
   2. Testing equipment will be provided by and tests performed by the testing laboratory. Upon request by the Commissioner, the Contractor shall provide such auxiliary personnel and services needed to accomplish the testing work.

1.9 DELIVERY, STORAGE AND HANDLING

A. Digging B&B Plant Material: Plants shall not be dug at the nursery until the Contractor is ready to transport them from their original locations to the site of the work or acceptable storage location.

B. Transportation of Plant Material:

   1. Plants transported to the project in open vehicles shall be covered with tarpaulins or other suitable covers securely fastened to the body of the vehicle to prevent injury to the plants. Closed vehicles shall be adequately ventilated to prevent over-heating of the plants.
   2. Plants shall be kept moist, fresh, and protected at all times. Such protection shall encompass the entire period during which the plants are in transit, being handled, or are in temporary storage. The roots of all trees, shrubs, vines, ground covers, ferns, grasses and perennials shall be protected from drying out with wet straw or other suitable material while in transit. At no time shall they be exposed to the sun.
   3. Deliver seed in original sealed, labeled, and undamaged containers.
   4. Unless otherwise authorized by the Commissioner, the Contractor shall notify the Commissioner at least two working days in advance of the anticipated delivery date of any plant material. Contractor shall inform the Commissioner of plant types and quantities in said delivery. A legible copy of the bill of lading, showing the quantities, kinds, and sizes of materials included for each shipment shall be furnished to the Commissioner.

C. Storage:

   1. Unless specific authorization is obtained from the Commissioner, plants shall not remain on the site of work longer than three days prior to being planted.
   2. Plants that are not planted immediately shall be protected as follows:
      a. Earth balls shall be kept moist and their solidity carefully preserved.
      b. Plants shall not be allowed to dry out or freeze.
      c. Ground cover, grasses, perennial and fern pots and flats, plugs, and all other containers shall be protected from sun and kept moist.
      d. Bare root plants shall be protected from sun and kept moist.

D. Handling of Plant Materials: Contractor shall exercise care in the handling of plant materials to avoid damage or stress.

E. Plants shall be sprayed prior to shipping with antidesiccant to prevent drying out during trucking and handling.

F. Contractor is responsible for damage to property caused by planting operations; all areas and construction disturbed shall be restored to their original conditions to satisfaction of the Commissioner.

1.10 REJECTION OF MATERIALS

A. Evidence of inadequate protection following digging, carelessness while in transit, or improper handling or storage shall be cause for rejection.

B. Upon arrival at the temporary storage location or the site of the work, plants shall be inspected for proper shipping procedures. Should the roots be dried out, large branches be broken, balls or earth broken or loosened, or areas of bark be torn, the Commissioner will reject the injured plant.

C. When a plant has been rejected, the Contractor shall at once remove it from the area of the work and replace it with one of the required size and quality.

1.11 ACCEPTANCE

A. The Commissioner will inspect all work for substantial completion upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection.

B. Acceptance of plant material by the Commissioner will be for general conformance to specified size, character and quality, and shall not relieve the Contractor of responsibility for full conformance to the Contract Documents.

C. Upon completion and re-inspection of all repairs or renewals necessary in the judgement of the Commissioner, they will recommend that acceptance of the work of this Section be given.

D. Acceptance of the work will begin the one year guarantee period as specified below.

E. Acceptance in Part:

1. The work may be accepted in part when it is deemed to be the Commissioner's best interest to do so, and when permission is given to the Contractor in writing to complete the work in parts.
2. Acceptance and use of such areas by the Commissioner shall not waive any other provisions of this Contract.

1.12 MAINTENANCE

A. The Contractor shall be responsible for the maintenance of the plant material until the completion of the guarantee period and Final Acceptance of the work. Maintenance shall be as described in Part 3 of this Section of the Specifications.

B. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than 60 days after date of Substantial Completion. Maintain lawns throughout the guarantee period.

1.13 GUARANTEE

A. Balled and burlapped trees and container plants shall be guaranteed for a period of two (2) years after the date of Acceptance by the Commissioner.

1. When the work is accepted in parts, the guarantee periods shall extend from each of the partial acceptance to the terminal date of the last guarantee period. Thus, all guarantee periods shall terminate at one time.

B. Plants shall be healthy, free of pests and disease, and in flourishing condition at the end of the guarantee period. Plants shall be free of dead and dying branches and branch tips, and shall bear foliage of normal density, size, and color.

C. All dead plants and all plants not in a vigorous, thriving condition, as determined by the Commissioner during and at the end of the guarantee period, shall be replaced by the Contractor, without cost to the City of New York, as soon as weather conditions permit and within the specified planting period.

1. Replacements shall closely match adjacent specimens of the same species and shall be subject to all requirements stated in these Specifications.
2. The Contractor shall make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the City of New York.
3. The guarantee of all replacement plants shall extend for an additional one year period from the date of their acceptance after replacement.

1.14 FINAL INSPECTION AND FINAL ACCEPTANCE

A. At the end of the guarantee period, the Commissioner will, upon written request of the Contractor, inspect the work for Final Acceptance. Request shall be received at least ten (10) calendar days before the anticipated date for Final Inspection.

B. Upon completion and re-inspection of all repairs or replacements necessary in the judgement of the Commissioner, the Final Acceptance of the Work of this Section will be given.

1.15 COORDINATION AND SCHEDULING

A. Coordinate installation of planting materials with the work of other trades.

B. Coordinate installation of plants during normal planting seasons for each type of plant required.

PART 2 – PRODUCTS

2.1 PLANTS

A. Except as otherwise specified, size and grade of plant materials shall conform to ANSI Z60.1. Where size exceeds that indicated in ANSI Z60.1, the ball size shall be proportionately larger. Contractor shall verify that adjacent construction will accommodate ball size and report any discrepancies to the Commissioner.

B. Measurement of Plants:

1. Trees, shrubs and other plants shall be measured in units of caliper, height or spread called for on the plans. The caliper, height or spread shall be a fair average between the minimum and maximum sizes specified, although the Contractor may, at his option and with the approval of the Commissioner, supply oversize plants, provided that this does not affect the Contract price. The Contractor shall verify that larger root balls will fit into

spaces provided by adjacent construction. Large plants or root balls cut back to sizes specified will not be accepted.

2. The caliper, height or spread and quality shall be measured in accordance with standards specified in the current American Association of Nurserymen, Inc. American Standard for Nursery Stock, unless otherwise specified.
3. Each plant shall be dimensioned as it stands in its natural position.
4. Deciduous trees (unless a caliper is specified), deciduous shrubs, and evergreen shrubs of an upright type shall be measured in units of average height in feet.
5. Evergreen and deciduous shrubs of a spreading type shall be measured in units of average spread in inches.
6. Vines, ground covers and/or perennials, grasses and ferns shall be measured by container size, root pot size, length of runners and/or age as specified.
7. The minimum sizes and root balls, ball depth and diameters, and increased ball sizes for collected stock shall be in accordance with "Recommended Balling and Burlapping Specifications," as set forth in the current edition of American Standard for Nursery Stock, sponsored by the American Association of Nurserymen, Inc. Balling and burlapping of material to be transplanted shall conform to these standards.

C. Balled and burlapped plants shall have outstanding form; they shall be symmetrical, heavily branched with an even branch distribution, densely foliated and/or budded, and a strong, straight, distinct leader where this is characteristic of species. The Commissioner will be the final arbiter of acceptability of plant form.

D. Plants shall be healthy and vigorous, free of disease, insect pests and their eggs, and larvae.

E. Plants shall have a well-developed fibrous root system.

F. Plants shall be free of physical damage such as scrapes, broken or split branches, scars, bark abrasions, sunscalds, fresh limb cuts, disfiguring knots, or other defects.

G. Plants shall meet the sizes indicated on the Plant Schedules. Plants larger or smaller than specified may be used only if accepted by the Commissioner.

H. Where a size or caliper range is stated, at least 50 percent of the material shall be closer in size to the top of the range stated.

I. Plants shall not be pruned before delivery, unless approved by the Commissioner in writing. Any pruning of trees or shrubs to accommodate structures shall be done by qualified personnel after installation and under direction of the Commissioner.

J. All trees and shrubs shall be labelled with botanical name, common name and variety. Labels shall be durable and legible, stating the correct plant name and size in weather resistant ink or embossed process. Labels shall be securely attached to all plants prior to delivery to the site, being careful not to restrict growth.

K. Plants indicated as "B & B" shall be balled and burlapped.

1. Unless otherwise permitted by the Commissioner, plants shall be nursery grown.
2. Plants shall be grown for at least two years under climatic conditions similar to those in the locality of the project.
3. Nursery grown plants shall be freshly dug. No heeled in plants or plants from cold storage will be accepted, unless otherwise permitted by the Commissioner.
4. Burlap shall not extend above the flare of the trunk, which shall be exposed.

L. Container grown plants shall be well rooted and established in the container in which they are growing. They shall have grown in the container for a sufficient length of time for the root system to hold the planting medium when taken from the container, but not long enough to become root bound. Container grown plants exceeding the sizes indicated in ANSI Z60.1 shall have containers which are not less than 75 percent of the ball sizes for comparable B&B plant material.

2.4 TOPSOIL

A. Unscreened Topsoil shall be natural loam topsoil (approximately 40% sand, 40% silt and a maximum of 20% clay), free from subsoil, obtained from an area which has never been stripped or treated with an herbicide and from a depth of no more than 1 foot, or less if subsoil is encountered, supplier certified as having been obtained from an area which has never been treated with herbicide and conforming to the following:

1. It shall be of uniform quality, free from hard clods, stiff clay, hard pan, sods, partially disintegrated stone, lime, cement, ashes, slag, concrete, tar residues, tarred paper, boards, chips, sticks or any other undesirable material.
2. It shall contain a minimum 6 percent organic matter as determined by loss on ignition of moisture-free samples and the pH range shall be pH 6.0 to pH 7.0 inclusive.
3. The soluble salts range shall be equal to or less than 1500 micromhos per centimeter.
4. The samples taken shall be in accordance with paragraph 1.6, QUALITY ASSURANCE, and will be tested as follows:

Sieve Analysis (By Wash Test. ASTM Designation D-1140)

Passing	Retained On	Percentage
1" Screen		99%
1" Screen	1/4" Screen (gravel)	0-5%
1/4" Screen No. 100	USS mesh sieve (sand)	40-60%
No. 100 USS	Very fine sand, silt and clay	40-60%

5. The percentage of clay shall be a maximum of 20 percent.
6. When the topsoil otherwise complies with the requirements of the specification but shows a deficiency of not more than one (1) percent in organic matter content, humus, or other approved organic matter may be incorporated when and as permitted by the Commissioner.
7. Definitions of sand, silt and clay shall be those used by the Association of Official Analytical Chemists.

2.5 PLANTING SOIL MIX

A. Planting soil mix is composed of topsoil, various soil amendments and nutrient control materials.

1. It shall contain a minimum of 12 percent organic matter as determined by loss of ignition of moisture free samples and the pH range shall be 5.0 to 7.0 inclusive. Additives and methods of incorporation to achieve this pH range shall be approved by the Commissioner.
2. The soluble salts range shall be equal to or less than 1500 micromhos per centimeter.
3. The samples taken shall be in accordance with paragraph 1.6, QUALITY ASSURANCE and will be tested for 95 percent passing a 1" screen.

B. Planting soil mix shall consist of the following:

1. Each 5 cubic yards of mix shall contain:

4 cubic yards of Topsoil
1 cubic yard of well rotted manure
5 pounds of bonemeal

C. Topsoil shall be loose, friable and not frozen or saturated at the time of mixing.

2.6 LEAF MOLD

A. Leaf mold shall come from an approved source. It shall conform to the following acidity and electrical conductivity ranges:

1. Acidity: pH 6.0 to 7.0 inclusive
2. Electrical Conductivity: The electrical conductivity (salt content) shall be less than two thousand (2000) micromhos/cm. It shall be tested using modified methods from the American Society of Agronomy procedures manual Methods of Soil Analysis Part 1 & 2, No. 9 in the Series Agronomy, and from the Annual Book of ASTM Standards, Methods D2974 and D2976.
3. Leaves shall be composted and turned sufficiently to destroy all weed seeds.

2.7 BONEMEAL (0-12-0)

A. Bonemeal shall be a formulated organic fertilizer having a guaranteed analysis as follows:

0%	Nitrogen
12%	P2O5
0%	K2O

2.8 FERTILIZERS

A. Fertilizer: Organic, containing not less than 5 percent nitrogen, 10 percent available phosphoric acid and 5 percent water soluble potash.

B. Other organic fertilizers with a 1-2-1 ratio such as 10-20-10 or 6-12-6 may be substituted for above.

C. Mychorrizal fungal transplant innoculant Mycor® Tree Saver®, or equivalent granular product. Mycor® Tree Saver® shall be as manufactured by Plant Health Care, Inc., 440 William Pitt Way, Pittsburgh, PA 15238. Telephone: 1.800.421.9051.

2.9 WELL-ROTTED MANURE

A. Manure shall be well-rotted horse or cow manure or a combination of well-rotted horse and cow manure. It shall contain not over forty (40) percent of straw or litter and shall be free from fresh manure, sawdust, wood chips, leather chips, tan-bark, long straw, salt hay, stones, chemicals used to hasten decomposition artificially and other foreign or injurious substances. It shall be no more than two (2) years or less than nine (9) months old and shall have been turned in the pile at least three (3) times during that period. No burned or fire flanged manure will be accepted. The Commissioner may inspect the manure before delivery but reserves the right to reject on or after delivery any material which does not, in his/her opinion, meet these specifications. The price bid shall include the cost of inspection. When manure is to be stored on the site, it shall be done as directed by the Commissioner.

2.10 LIMESTONE

A. Ground Limestone (Calcium Carbonate) shall have the following analysis: at least fifty percent (50%) shall pass a 200 mesh sieve; at least ninety percent (90%) shall pass a 100 mesh sieve; and one hundred percent (100%) shall pass a 10 mesh sieve. Total carbonates shall not be less than eighty (80) percent or 44.8% Calcium oxide equivalent. Pelleted limestone may be substituted at the discretion of the Commissioner, when wind conditions exceed five (5) miles per hour.

B. Limestone shall come from recycled sources.

2.12 WATER

A. Water shall be suitable for irrigation and shall be free from ingredients harmful to plant life.

B. Water shall come from rainwater or grey water sources.

2.13 ALUMINUM SULFATE

A. Aluminum sulfate shall be unadulterated and shall be delivered in containers with the name of the material, manufacturer, and net weight of contents.

2.14 MULCH

A. Shredded Hardwood Bark Mulch

1. Bark mulch shall be 100% organic, weed free, non-splintering, non-toxic, and natural color.
2. It shall be category 3 base bark having a maximum of 10% wood fiber, fibrous in nature and processed in accordance with the National Bark Producers Association.
3. It shall be free of all slabbing and large particles, 92% passing one half inch (1/2") screen and shall have a pH of approximately 6.1 as manufactured by Greenlife Products Company, West Point, VA, or approved equal.
4. Elm bark is not acceptable.

B. Straw Mulch: Clean and seed free.

2.15 GUYING AND STAKING MATERIALS

A. Tree Stakes: White cedar stakes with bark attached, middle diameter of 2 1/2" to 3" and a butt diameter of not more than 3 1/2".

B. Treestrap: Treestraps shall be biodegradable cotton with the following characteristics:

1. Color: natural
2. Break strength: 850 lbs nominal
3. Width: 1 inch (2.5 cm)
4. Length: 32 inches (70 cm)
5. Weight: 1.4 ounces each
6. Tack & washer: Galvanized 1 inch nail with gr. plastic retaining washer

2.16 ANTIDESICCANT

A. Antidesiccant shall be an emulsion specifically manufactured for plant protection which provides a protective film over plant surface which is permeable enough to permit transpiration. Antidesiccant shall be delivered in manufacturer's sealed containers and shall contain manufacturer's printed instructions for use.

B. Antidesiccant shall be equal to the following:

Product	Manufacturer
Wiltpruf	Nursery Specialty Products, Inc. Stubbins Road, Groton Falls, NY

2.17 SAND FOR SOIL AMENDMENTS

A. Sand shall consist of clean, hard, durable, uncoated stone particles, free from lumps of clay and all deleterious substances. Sand shall be so graded that when dry, one-hundred percent (100%) shall pass through a one-quarter inch (1/4") square opening sieve; not more than thirty-five percent (35%) by weight shall pass a No.50 sieve and not more than ten percent (10%) by weight shall pass a No.100 sieve. Sand may be rejected for this class if it contains more than ten percent (10%) by weight of loam and silt.

2.18 PORTABLE DRIP IRRIGATION SYSTEM

A. TreeGator portable drip irrigation system shall be the following:

1. Constructed of U.V. stabilized, reinforced, rip-stop polyethylene with reinforced nylon zippers.
2. Each TreeGator bag to have 20 gallon water capacity and weigh 1 1/2 pounds empty.
3. TreeGator bags shall be as manufactured by Spectrum Products, Raleigh, NC 27619-8187, or approved equal.
4. TreeGator bags shall become the property of the City of New York at the end of the Guarantee period.

PART 3 – EXECUTION

3.1 EXAMINATION OF SUBGRADE PRIOR TO PLANTING OPERATIONS

A. Subgrade shall be examined by the Contractor prior to start of planting work. Subgrade shall have been graded smooth and parallel to finish grades compacted to 90 percent. Subgrade shall drain perfectly. The Commissioner shall have examined results of subgrade soil tests prior to the start of planting work. The Commissioner shall have examined drainage and compaction of subgrade materials immediately before start of planting work. Any unacceptable subgrade conditions shall be brought to the attention of the Commissioner and corrected before planting work commences.

B. The Contractor shall place barricades as required to prevent any unnecessary compaction or disturbance of rough grading.

C. Limit subgrade preparation for lawn to areas that will be planted in the immediate future.

3.2 DRAINAGE OF SOILS

A. Test drainage of planting beds and tree pits chosen by the Commissioner shall be done by filling with water twice in succession. The time at which water is put into the pit or bed for a second filling shall be noted. The Commissioner shall then be notified of the time it takes for pit or bed to drain completely. Planting operations shall not proceed until the Commissioner has reviewed test drainage results.

B. The Contractor shall notify the Commissioner in writing of all soil or drainage conditions that he considers detrimental to growth of plant material.

C. Areas to be sodded or seeded shall drain freely. No puddling will be accepted.

3.3 SCARIFYING SUBGRADE

A. Subgrade shall be brought to true and uniform grade and cleared of all extraneous materials by Contractor. After trees have been placed on subgrade, topsoil shall be backfilled throughout entire planting bed between tree balls.

B. Tree balls shall be placed directly on thoroughly compacted undisturbed subgrade to prevent settlement.

3.4 AMENDING EXISTING SOIL SITE INTERIORS

A. Soil shall be amended only where existing soil is disturbed by grading and where new plantings, including seed, are to be installed, and if existing soil is found, after testing, to be otherwise unacceptable for planting.

B. Woody Plantings : Contractor to add leaf mold, to 25% by volume, into the upper one (1) foot of soil. Leaf mold shall be thoroughly mixed in to the satisfaction of the Commissioner. Contractor to add elemental sulfur at a rate of 1 to 1 1/4 pounds to 50 gallons of water per 100 square feet to change the soil acidity by 1 pH unit if need is indicated by soil tests.

3.5 LAYOUT OF PLANTING AREAS

A. Individual plant locations and outlines of shrub and ground cover areas to be planted shall be staked by the Contractor in ample time to allow inspection by the Commissioner.

3.6 PLANTING SEASON

A. Spring Planting for trees, shrubs and perennials:

1. Spring planting of deciduous plants may commence after March 15th or as soon as the ground has thawed at the nursery and at the site of planting, and weather conditions make it practicable to work both at the nursery and at the site.
2. Unless otherwise directed by the Commissioner, evergreen plant material shall be planted from April 1st to May 15th.
3. Spring planting of deciduous plants shall not occur any later than June 1.

B. Fall Planting for trees, shrubs,and perennials:

1. Fall planting for deciduous trees and shrubs may commence September 15th and shall continue until December 1st or such time as the ground has frozen or weather conditions make it impractical to work.
2. Fall planting period for evergreen trees and shrubs shall be September 1st to October 15th.

C. Regardless of the dates specified above, planting shall only be performed when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice.

D. Planting season may be extended only with the written permission of the Commissioner.

3.7 PLANTING TREES, SHRUBS, AND PERENNIALS

A. Balled and burlapped trees

1. Excavate and completely remove all soil from pits. Pit size shall be 2½ times the diameter of the root ball.
2. Wire baskets and/or non-biodegradable cloth wrapping shall be completely removed from the root ball.
3. Trees shall be located as indicated on the Drawings. Trees shall be placed on compacted clean fill such that when backfilled with topsoil, they shall have exactly the same relationship to finished grade as in the nursery.
4. Trees shall be turned to desired orientation as requested by the Commissioner.
5. After trees have been properly placed, ropes or strings on top of ball shall be cut and pulled back. If burlap and binding reveal that the tree is set too deep relative to finished grade, the tree ball shall be rewrapped, removed and the subgrade depth raised with clean, compacted fill.
6. After final placement, burlap or cloth wrapping shall be left intact around the ball except that portions of wrap that are exposed at top of ball shall be turned over and buried or removed (approximately 1/3 of the burlap shall be turned back or removed). Non-biodegradable ball wrapping shall be totally removed from ball.
7. Tree pit shall be backfilled with Planting Soil Mix, as specified.
8. Contractor shall fertilize each tree using Mycor® Tree Saver®. Use 3 ounces per each foot diameter of the rootball, or 3 ounces per inch caliper. Mix into the backfill. Mix product in a ring-shaped volume of soil around the upper portion of the root ball, extending from the soil surface to a depth of about 8 inches, and extending out from the root ball about 8 inches into the backfill.
9. Saucers shall be formed around plant pits as indicated on the Drawings.
10. Saucer shall be filled with water and water left to soak in. Saucer shall then be filled with water again.

C. Shrubs and containerized grasses and perennials

1. Contractor shall layout sample sections with shrubs, groundcovers, vines, grasses and/or staked tree locations. Where trees, shrubs and ground covers, etc. are to be planted in the same bed, and after approval by Commissioner, shrubs shall be placed on compacted clean well drained fill and backfilled to the level of the bottom of the shrub root balls with Planting Soil Mix.
2. Planting Soil Mix shall be tamped firmly around trees prior to placement of shrubs. Shrubs shall be laid out to assure regular spacing between shrubs and shrub rows as shown on the plans. Planting soil mix shall be firmly tamped under shrub root balls.
3. Shrubs: Containerized plants shall be removed from container, taking care not to damage roots. The side of the root ball shall be scarified to prevent root-bound condition and plant positioned on planting soil mix. Balled and Burlapped shrubs shall receive the same treatment as Balled and Burlapped Trees as specified above. Planting soil mix shall be backfilled around all shrubs to finish grades indicated on grading plans, tamping all areas solidly and evenly. Soil shall be worked carefully into voids and pockets. Every effort shall be made to create a uniform level of compaction throughout all plant beds.
4. Containerized grasses and perennials shall be planted according to spacings indicated on the Plant Schedule and Drawings. If placing in the same planting bed, no grasses or perennials shall be planted until all trees and shrubs are planted.
5. Grasses and perennials shall be removed from pots; roots shall be combed; and the plants placed in the prepared topsoil which shall then be tamped to set the plants firmly in place.
6. One 3-oz. scoop of Mycor ™ Tree Saver or equal granular product, containing mycorrhizal fungal transplant inoculant , Terra-Sorb ® or equivalent hydrogels, natural humates, yucca plant extract and seaweed meal, shall be evenly spread in a ring up to 8" wide around the outside edge of EACH root ball for shrubs and grasses.

7. Finish backfilling around each shrub, grass or perennial. Thoroughly mix area around edge of rootball up to 8" wide to a depth of 8". Tamp all areas solidly and evenly. Soil shall be worked carefully into voids and pockets. Every effort shall be made to create a uniform level of compaction throughout all plant beds.
8. After completely planting each group of shrubs, Contractor shall mulch the entire area to a depth of 2" with shredded hardwood bark mulch.
9. Planting bed shall be thoroughly watered and water left to soak in; it shall then be thoroughly watered again.

3.11 APPLICATION OF FERTILIZER

A. Fertilizer shall be as described in Article 3.7 above

3.12 GUYING

A. Each tree, new or transplanted, shall be staked in accordance with the Drawings and Specifications. Plants shall stand plumb after staking.

B. Installation of Treestrap: Install one strap per stake. Overlap strap-ends to desired adjustment and strike nail into stake. Always hammer away from the body and strike the nail squarely on the head. Safety goggles should always be worn when installing the treestrap.

3.13 MULCHING

A. Shredded hardwood bark mulch shall be applied to a depth of two (2) inches in all individual tree pits and in all planting beds. Keep an inch away from the base of all stems of shrubs and 12" from the trunks of all trees. Do not bury ground cover plants or ferns.

3.14 PRUNING

A. Each tree and shrub shall be pruned only as needed to repair damage, taking care to preserve the natural character of the plant. Pruning shall be done after delivery of plants and after plants have been inspected and approved by the Commissioner. Pruning procedure shall be reviewed with the Commissioner before processing.

B. Pruning shall be done with clean, sharp tools. Cuts shall be made to the branch collar, neither cutting flush norleaving stubs. No tree paint shall be used.

C. Dead wood, suckers, and broken and badly bruised branches shall be removed.

3.15 WATERING

A. Trees and shrubs

1. Plants shall be flooded with water twice within the first twenty-four (24) hours of the time of planting, and not less than twice per week until acceptance or for one month, whichever is greater. Do not disturb soil contour in bed during watering process.
2. The Contractor shall be responsible for providing all equipment required to water the plants as specified herein. Water shall be supplied by the City of New York.
4. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary and in sufficient quantities to maintain moist soil to a depth of at least 4 inches.
3. Two (2) TreeGator bags, zipped together, shall be required for each tree. Two open holes per bag, with an approximate 6-10 hour leak time. The Contractor shall remove TreeGator bags at the end of each watering period. TreeGator bags shall be filled three (3) times per week from April 15th through November 15th.

3.16 MAINTENANCE - GENERAL

A. The Contractor shall maintain all planting in accordance with these specifications and drawings, and to the satisfaction of the Commissioner, for two years after the acceptance, and until final acceptance and completion of all planting in the contract.

B. The Contractor shall submit to the Commissioner for approval a proposed maintenance schedule specifying men, materials, and equipment required to comply with the maintenance provisions. The proposed schedule shall commence two (2) weeks from the date of acceptance.

C. Maintenance shall consist of pruning, watering, cultivating, weeding, mulching, removal of dead material, repairing, replacing or removal of tree stakes as directed by the Commissioner, adjusting and/or removal of treestraps as directed by the Commissioner, resetting plants to proper grades and upright position, repair of minor washouts and gullies,and furnishing and applying such organic sprays as are necessary to keep plantings free of insects and disease. Plants shall be maintained in a healthy growing condition using the above and other horticultural operations necessary for the proper growth of all plants. The entire area shall be kept neat in appearance. All maintenance operations shall be by means acceptable and approved by the Commissioner. Note that all materials and replacements used during the maintenance period shall conform to Section 2, Products of this Specification.

D. Maintenance shall be repeated at least once every three weeks. Dead, dying or undesirable plants shall be removed during this period at the direction of the Commissioner.

E. Weeds shall not be allowed to attain more than six inches of growth, unless otherwise directed by the Commissioner.

END OF SECTION

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SECTION 33 3000

SANITARY SEWERAGE UTILITIES

PART 1. - GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General Agreement and Supplementary Conditions and Division 1 - General Requirements, apply to the work of this Section.

1.2 DESCRIPTION

A. Prepare and submit a Site Connection Proposal with NYC DEP

B. Furnish and install the sanitary drains required during construction in accordance with approved site connection proposal.

C. Provide piping, manholes, etc.

D. Comply with State, County and City regulations for erosion sanitary drain piping during construction.

1.3 SUBMITTALS

A. Submit Site Connection Proposal. The Professional Engineer shall file and obtain an approved site connection proposal with the New York City Department of Environmental Protection (NYC DEP), which the contractor will need to obtain a sanitary connection permit. The approval will be valid for a period of two (2) years. SCR-238/10 was approved by the NYC DEP on 10/12/2010.

B. Submit shop drawings for all piping and structures. In the event that the contractor wishes to use materials that are not as per the NYC DEP Sewer Design Standards or NYC Building Code, they shall submit shop drawings to the Commissioner. The contractor shall submit shop drawings of said materials to the Commissioner.

C. Material certificates for piping and manholes.

1.4 REFERENCES

A. Sewer Design Standards, New York City Department of Environmental Protection.

B. Standard Sewer Specifications, New York City Department of Design & Construction.

C. Building Code of the City of New York

D. American Standards Association for Cast Iron Pipe.

E. American Water Works Association for Cast Iron Fittings.

1.5 PERMITS

A. The Contractor shall obtain all necessary permits for disposing of storm water.

1.6 RELATED WORK

A. No Related work.

1.7 SAFETY

A. In regards to sheeting of the sewer trench during excavation, the contractor shall comply with the provisions of New York State Labor Law and particularly with Rule #23 (as amended) of the Industrial Code as promulgated by the Board of Standards and Appeals, Department of Labor, State of New York.

B. Where the spacing of stringers and cross-bracing specified in the above stated rule #23 are such that the contractor can not adequately and in a practical manner carry on his operations, he shall submit to the Commissioner for approval, an alternate scheme and design for sheet piling or shoring with all bracing as may be necessary to comply with the intent of rule #23.

C. The contractor shall post signs for safety. Local traffic is to be maintained at all times. A flag man should be used to direct traffic when necessary.

D. During performance of the work, the contractor must take all reasonable precautions to protect the site. The contractor shall provide, place and adequately maintain sufficient guards, lights, barricades and enclosures. The contractor shall retain steel roadway plates on-site for trench protection during construction.

E. All materials are to be stored within the property. No stock piling material or equipment in the street.

F. The contractor is responsible for utility company notification – Code 53.

G. It is recommended that the Contractor take some photographs of the area before the commencement of the work.

1.8 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary. The contractor shall not accept delivery of any damaged materials to the site. Damaged materials shall not be used. The inspector shall have final say over any materials in question.

1.9 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen 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. A licensed plumber will be required to obtain the sewer connection permits from the NYC DEP.

B. The contractor shall engage the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures and professional seals, etc. compliant with NYC Department of Buildings requirements, for each concrete design mix. The contractor shall also engage the services of a New York City licensed Soil Testing Lab for each soil density test performed.

C. The contractor is required to provide manufacturer certification for all types of pipes used as specified, and all pre-cast manholes.

D. The contractor is responsible for co-coordinating all the surveying work (stake-out, line and grade, etc.) that is necessary for the internal sanitary drainage work.

PART 2. - PRODUCTS

2.1 MATERIAL

A. Pipe

1. The sanitary connection shall be 6" Ductile Iron Pipe 60-42-10 grade and class 56, lined with ceramic epoxy or the contractor may use Extra Heavy Cast Iron (class 50).

2. EHCI pipe shall comply with the requirements of the latest Standard Specifications of the American Standards Association for Cast Iron Pit Cast Pipe, Designation A21.2 or Cast Iron Centrifugally Cast Pipe, Designations A21.6 and A21.8. Fittings shall comply with the requirements of the latest Standard Specifications of the American Water Works Association for Cast Iron Fittings, Designation C100-08.

3. All joints for ductile iron pipe sewers shall be "push-on" joint type. Joints shall be made in accordance with the manufacturer's instructions for assembling the type of joint furnished. Fittings shall be ductile iron or gray iron (250 psi) mechanical joints in accordance with the latest revisions of ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11.

C. Manholes

1. The manholes shall be 4' diameter pre-cast manholes, as per the NYC DEP Sewer Design Standards.

PART 3. - EXECUTION

3.1 INSPECTION

A. Inspection of selected materials, equipment, installation 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 NYC Construction Codes requirements. The Special Inspector shall be an entity compliant with the requirements of the 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. 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 complete.

C. Inspections and tests performed under "Special Inspection" 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".

D. The contractor must coordinate with Resident Engineer or DDC Project Manager to provide access and schedule the work for inspection by the Special Inspector.

3.2 INSTALLATION

A. SANITARY

a. The sanitary connection shall be 6" Ductile Iron Pipe 60-42-10 grade and class 56, lined with ceramic epoxy or the contractor may use Extra Heavy Cast Iron (class 50).

b. EHCI pipe shall comply with the requirements of the latest Standard Specifications of the American Standards Association for Cast Iron Pit Cast Pipe, Designation A21.2 or Cast Iron Centrifugally Cast Pipe, Designations A21.6 and A21.8. Fittings shall comply with the requirements of the latest Standard Specifications of the American Water Works Association for Cast Iron Fittings, Designation C100-08.

c. All joints for ductile iron pipe sewers shall be "push-on" joint type. Joints shall be made in accordance with the manufacturer's instructions for assembling the type of joint furnished. Fittings shall be ductile iron or gray iron (250 psi) mechanical joints in accordance with the latest revisions of ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11.

d. The pipe shall be laid on ¾" to ¼" crushed stone bedding, at a minimum depth of 9"under the pipe and up to the center of the pipe.

e. The stone and pipe shall be wrapped in filter fabric (Mirafi 140 or equivalent).

f. Clean backfill shall be approved clean earth or sand of low silt and clay content (less than 12% passing No. 200 sieve), free from bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic material. All material shall be free from frost at time of placement. There shall be no stones larger than six (6) inches in their largest dimension.

g. The 6" sanitary house connection into the 10" sanitary sewer in Veterans Road West shall be subject to inspection by the NYC DEP. The contractor is responsible for obtaining the required permits from the NYC DEP and NYC DOT and coordinating the inspection with the NYC DEP. Inspection by an Engineer is not required for the sanitary house connection.

h. The existing septic system shall remain in use until the demolition of the existing building. At that time, the septic system shall be removed or filled with compacted sand. If the system is removed, then it shall be back-filled with clean fill. The area shall be filled with compacted clean fill in layers not to exceed 24" in depth. Each layer shall be thoroughly compacted to a minimum of 95% of standard proctor maximum density.

i. When the septic system is to be abandoned, the contractor shall obtain the file the Limited Alteration Application (LAA) with the NYC DOB.

j. The property owner/contractor shall, as soon as possible, contact the owner of PDR - 003/06, in writing, in order to obtain permission to connect into the sanitary sewer and to determine the connection charge. The contractor will need a signed private sewer consent form in order to obtain a connection permit from the Local Sewer Office (Richmond County).

k. Sewer Owner: (info taken from PDR-003/06, as on record with NYC DEP): Guido Passarelli
1600 Hylan Boulevard
Staten Island, NY 10305

l. The contractor shall not start work on the connection until he has confirmed the location and elevation of the house trap and confirmed the invert elevations of the existing manholes in Veterans Road West.

m. The contractor shall also verify the location and depths of the existing gas main and water main in Veterans Road West.

n. The sanitary connection shall be as per the sewer design standards of the NYC DEP, and under their inspection.

o. The contractor shall saw cut the existing pavement prior to trench excavation.

p. The contractor shall use a steel box to sheet the trench to its full height.

q. Pavement requirements shall conform to NYC DOT requirements where required. Temporary pavement restoration of the sanitary connection trench in the existing paved area shall be done immediately after the trenches are backfilled. No final pavement shall be done prior to six weeks from the placement of the temporary pavement.

3.3 TRENCH RESTORATION

A. Sanitary sewer connection.

a. All undermined base shall be removed prior to backfilling.

b. All trenches shall be backfilled with good to excellent fill as per bureau of traffic specifications.

c. Backfill material shall be deposited in horizontal layers not exceeding 12" in thickness prior to compaction. A minimum of 95% of standard maximum density will be required. When placing backfill around pipes, layers shall be deposited to progressively bury the pipe to equal depths on both sides. Compaction shall be achieved by the use of impact hammers, plate or small drum vibrators or pneumatic button head compaction equipment. Hand tamping is not permitted except in the immediate area of the underground facility.

d. All restoration shall conform to the standards and specifications of DOT Bureau of Traffic and in process inspection and testing shall be certified by a licensed professional engineer.

e. When the existing pavement is asphalt on concrete base. Concrete shall be removed to a width of W + 1 ft by (hand held) pneumatic hammer chisel cut. Asphalt shall be removed to width of not less than W + 2 ft by saw-cut and grinding or peeling so as not to damage concrete base.

f. When the existing pavement is asphalt macadam without concrete base. The contractor shall saw-cut a width of not less than W + 1 ft of the existing pavement and restore this to conform to the existing pavement and sub-base material.

3.3 MATERIALS

A. Manholes & Pipe – suggested vendors or approved equal:

1. Coastal Pipeline Products Corp.

2785 Noyac Road
Sag Harbor, NY 11963
PH 631-369-4000
FAX 631-369-4006

2. T. Mina Supply, Inc.
126-53 36th Avenue
Flushing, NY 11368
PH 718-397-5200
FAX 718-397-5206

3. NE Pipe Farmingdale (Oldcastle)
89 Yellowbrook Road
Farmingdale, NY
PH 732-938-5639

3.4 FIELD QUALITY CONTROL

A. The Contractor shall not commence site disturbance work until:

1. Site Connection Proposal has been approved by the NYC DEP.

2. All required permits have been obtained.

B. Use adequate numbers of skilled workmen 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. A licensed plumber will be required to obtain the sewer connection permits from the NYC DEP.

C. The contractor is responsible for co-coordinating all the surveying work (stake-out, line and grade, etc.) that is necessary for the internal sanitary drainage work.

D. The contractor is required to provide manufacturer certification for all types of pipes used as specified, and all pre-cast manholes.

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SECTION 33 4000

STORM DRAINAGE UTILITIES

PART 1. - GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General Agreement and Supplementary Conditions and Division 1 - General Requirements, apply to the work of this Section.

1.2 DESCRIPTION

A. Prepare and submit a Site Connection Proposal with NYC DEP

B. Furnish and install the storm drains and retention chambers required during construction in accordance with approved site connection proposal.

C. Provide piping, manholes, drywells, etc.

D. Comply with State, County and City regulations for storm drain piping during construction.

1.3 SUBMITTALS

A. Submit Site Connection Proposal. The Professional Engineer shall file and obtain an approved site connection proposal with the New York City Department of Environmental Protection (NYC DEP), which the contractor will need to obtain a sanitary connection permit. The approval will be valid for a period of two (2) years. SCR-238/10 was approved by the NYC DEP on 10/12/2010.

B. Submit shop drawings for all piping and retention chambers. In the event that the contractor wishes to use materials that are not as per the NYC DEP Sewer Design Standards or NYC Building Code, they shall submit shop drawings to the Commissioner. The contractor shall submit shop drawings of said materials to the Commissioner.

C. Material certificates for piping, manholes and drywells.

1.4 REFERENCES

A. Sewer Design Standards, New York City Department of Environmental Protection.

B. Standard Sewer Specifications, New York City Department of Design & Construction.

C. Building Code of the City of New York

D. American Standards Association for Cast Iron Pipe.

E. American Water Works Association for Cast Iron Fittings.

1.5 PERMITS

A. The Contractor shall obtain all necessary permits for disposing of storm water.

1.6 RELATED WORK

A. No Related work.

1.7 SAFETY

A. In regards to sheeting of the sewer trench during excavation, the contractor shall comply with the provisions of New York State Labor Law and particularly with Rule #23 (as amended) of the Industrial Code as promulgated by the Board of Standards and Appeals, Department of Labor, State of New York.

B. Where the spacing of stringers and cross-bracing specified in the above stated rule #23 are such that the contractor can not adequately and in a practical manner carry on his operations, he shall submit to the Commissioner for approval, an alternate scheme and design for sheet piling or shoring with all bracing as may be necessary to comply with the intent of rule #23.

C. The Contractor shall post signs for safety. Local traffic is to be maintained at all times. A flag man should be used to direct traffic when necessary.

D. During performance of the work, the contractor must take all reasonable precautions to protect the site. The Contractor shall provide, place and adequately maintain sufficient guards, lights, barricades and enclosures. The Contractor shall retain steel roadway plates on-site for trench protection during construction.

E. All materials are to be stored within the property. No stock piling material or equipment in the street.

F. The Contractor is responsible for utility company notification – Code 53.

G. It is recommended that the Contractor take some photographs of the area before the commencement of the work.

1.8 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary. The Contractor shall not accept delivery of any damaged materials to the site. Damaged materials shall not be used. The Inspector shall have final say over any materials in question.

1.9 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen 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. A Licensed Plumber will be required to obtain the sewer connection permits from the NYC DEP.

B. The Contractor shall engage the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures and professional seals, etc. compliant with NYC Department of Buildings requirements, for each concrete design mix. The Contractor shall also engage the services of a New York City licensed Soil Testing Lab for each soil density test performed.

C. The Contractor is required to provide manufacturer certification for all types of pipes used as specified, and all pre-cast manholes, yard drains, zipper drains and retention chambers or drywells.

D. The Contractor is responsible for co-coordinating all the surveying work (stake-out, line and grade, etc.) that is necessary for the internal storm drainage work.

PART 2. - PRODUCTS

2.1 MATERIAL

A. Pipe

1. The internal storm drains shall be Ductile Iron Pipe (class 56 or greater), since this project is in Manufacturing zoning.

2. The pipe shall be laid on ¾" to ¼" crushed stone bedding, at a minimum depth of 9" under the pipe and up to the center of the pipe.

3. The DIP shall be used for storm drainage, except that corrugated polyethylene piping with a diameter of twelve inches or more and plastic fittings may be used, as per NYC Local Law 2/2001.

4. All yard drains shall be in accordance with the NYC Building Code (RS 16-9A) and their covers shall be ADA compliant.

5. Manhole covers and other appurtenances of the drainage system shall not bear any identification relating to the NYC Department of Environmental Protection (DEP).

6. The internal storm drainage is subject to a controlled inspection by the Commissioner. The Commissioner shall supply the City of New York with the required TR-1 forms when construction of the internal storm drainage is complete.

7. The contractor shall notify the inspector 72 hours prior to the commencement of work.

8. Ductile Iron piping shall be laid on a 9" crushed stone bedding and wrapped in a filter fabric.

9. All manholes and drains shall be laid on a 6" crushed stone base.

10. During construction of the new building, a new 8" DIP storm drain shall be installed at the rear of the building leading to the new drywell system. The existing roof leaders shall be reconnected into this pipe. The roof leaders at the front of the building shall be reconnected into the new 8" and new 10" storm drains temporarily.

11. The Contractor shall take measures to insure that no debris enters into the drainage system during construction. At the end of construction, the Contractor shall clean out all yard and zipper drains, and manholes of any dirt or debris.

B. Manholes

1. The manholes shall be 4' diameter pre-cast manholes, as per the NYC DEP Sewer Design Standards.

C. Drywells

1. Pre-cast drywells shall be in the size as specified on the plan. Any deviation shall be approved by the Commissioner prior to ordering the rings.

2. A circular, traffic slab (H20 traffic load) with one – 24" opening shall be used for each ring.

3. Concrete strength shall be 4,000 psi for 28days.

4. Drywells shall be in accordance with the NYC Building Code (RS 16-9B).

5. Gravel size to be used shall be 1.5" minimum. The use of recycled stone <u>is not</u> permitted.

6. Filter fabric shall be used to wrap the drywell system on the sides and top.

7. Two – 24" polyvinyl chloride (PVC) pipes will be used, one over each sand column. The length of the pipe shall be 6', with 1" diameter openings @ 4" o.c.

8. The new drywell system is subject to controlled inspection by the Commissioner and by the NYC Department of Buildings (NYC DOB).

9. The Inspector shall be on-site on a full time basis as long as work is being done.

10. Any existing drywells encountered shall be removed. The area shall be filled with compacted clean fill in layers not to exceed 24" in depth. Each layer shall be thoroughly compacted to a minimum of 95% of standard proctor maximum density.

11. Two 3' x 7' sand columns shall be installed as per the plan. The sand columns shall be dug to a depth of at least 5' into a permeable soil. The two columns are

predicated on the fact that there are three 10' diameter rings to be installed. If the number of rings increases or decreases, the Commissioner shall be notified in order to adjust the number of columns. It will be up to the determination of the NYC DOB inspector and the inspecting Engineer if the site connection proposal needs to be re-approved showing the new drywell lay-out.

12. Drywell rings shall be surrounded by 2' minimum of stone and wrapped in a filter fabric. Drywells shall sit on a minimum of 2' of stone.

13. Stone shall be placed up to the top of the traffic slabs.

14. Filter fabric shall be wrapped over the entire system. Minimum of 12" overlap on top of rings and on the sides.

PART 3. – EXECUTION

3.1 INSPECTION

A. Inspection of selected materials, equipment, installation 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 NYC Construction Codes requirements. The Special Inspector shall be an entity compliant with the requirements of the 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. 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 complete.

C. Inspections and tests performed under "Special Inspection" 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".

D. The Contractor must coordinate with Resident Engineer or DDC Project Manager to provide access and schedule the work for inspection by the Special Inspector.

3.2 INSTALLATION

A. The Contractor is responsible for the location, maintenance, removal and/or relocation of all utilities within the project limits. The Contractor is responsible for immediately notifying the Commissioner in the event that any uncharted or incorrectly charted utilities are encountered during construction.

B. The internal storm drainage is subject to a controlled inspection by a registered architect or professional engineer. The inspector shall supply the Commissioner with the required TR-1 forms when construction of the drains are complete.

C. The Contractor shall notify the inspector 72 hours prior to the commencement of work.

D. All Storm drainage and appurtenances within the property lines of this project are under the jurisdiction of the NYC DOB and subject to controlled inspection.

E. When necessary, the contractor shall use a steel box to sheet the trench to its full height.

F. Clean backfill shall be approved clean earth or sand of low silt and clay content (less than 12% passing No. 200 sieve), free from bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic material. All material shall be free from frost at time of placement. The new retention system is subject to controlled inspection by a registered architect or professional engineer and by the NYC Department of Buildings (NYC DOB). The Contractor shall notify the inspector 72 hours prior to the commencement of work. The inspector shall notify the NYC DOB 48 hours prior to the retention system installation.

G. The inspector shall be on-site on a full time basis as long as work is being done.

H. Any existing drywells encountered shall be removed at the judgment of the Commissioner. The area shall be filled with compacted clean fill in layers not to exceed 24" in depth. Each layer shall be thoroughly compacted to a minimum of 95% of standard proctor maximum density.

I. PVC piping shall be laid on a 6" crushed stone bedding and wrapped in a filter fabric.

J. All manholes and drains shall be laid on a 6" crushed stone base.

K. The Contractor shall take measures to insure that no debris enters into the drainage system during construction. At the end of construction, the contractor shall clean out all drains and replace stone if needed in the French drains.

L. If a permeable sand layer is below the depth of the bottom of the retention system, then 3'x7' sand columns shall be installed as per the plan. The sand columns shall be dug to a depth of at least 5' into a permeable strata. The number of sand columns per each retention system shall be as shown on the plan.

M. There shall be a minimum separation of 2 feet from the bottom of the chambers to the groundwater table.

N. Retention chambers shall sit on a 12" stone bedding.

O. 6" minimum of stone shall be placed on top of the retention chambers and 12" of stone on the sides.

P. Filter fabric shall be wrapped around the entire system. Minimum of 12" overlap.

3.2 MATERIALS

A. Concrete Structures (manholes, yard drains, drywells) & Pipe – suggested vendors or approved equal:

1. Coastal Pipeline Products Corp.
   2785 Noyac Road
   Sag Harbor, NY 11963
   PH 631-369-4000
   FAX 631-369-4006

2. T. Mina Supply, Inc.
   126-53 36th Avenue
   Flushing, NY 11368
   PH 718-397-5200
   FAX 718-397-5206

3. NE Pipe Farmingdale (Oldcastle)
   89 Yellowbrook Road
   Farmingdale, NY
   PH 732-938-5639

3.3 FIELD QUALITY CONTROL

A. The Contractor shall not commence site disturbance work until:

   1. Site Connection Proposal has been approved by the NYC DEP.

   2. All required permits have been obtained.

B. Use adequate numbers of skilled workmen 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. A licensed plumber will be required to obtain the sewer connection permits from the NYC DEP.

C. The Contractor is responsible for co-coordinating all the surveying work (stake-out, line and grade, etc.) that is necessary for the internal storm drainage work.

D. The Contractor is required to provide manufacturer certification for all types of pipes used as specified, and all pre-cast manholes, yard drains, zipper drains and drywells.

END OF SECTION

FMS ID: **HL82SIABE**

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

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

Staten Island Animal Care and Control Center Reconstruction

LOCATION: **3139 Veterans Road West**
BOROUGH: **Staten Island 10309**
CITY OF NEW YORK

Contractor

Dated _____, 20____

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____, 20____